# STANDARD SPECIFICATIONS FOR CONSTRUCTION



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- c. Type IP, I(PM), IP-A, and I(PM)-A Pozzolen Cements.—These portland cements shall conform to the requirements of ASTM C 595.
- d. White Coment.—This portland cement shall conform to requirements for Type I of ASTM C 150, except that it shall contain not more than 0.55 percent of ferric oxide (Fe<sub>2</sub>O<sub>3</sub>) by weight. The requirements for Gillmore setting time test and compressive strength through the 28-day test shall apply.
- 8.01.04 Masonry Cement.—Masonry cement shall conform to ASTM C 91.
- 8.01.05 Hydrated Lime.—Hydrated lime shall conform to **ASTM C 207.**
- 8.01.06 Ground Blast-Furnace Stag.-Ground blastfurnace slag shall conform to the requirements of ASTM C 989, Grade 100. It shall be used only as a blending material with Type IA or Type I portland cement, and only when approved on a project-by-project basis.

### 8.02 AGGREGATES

8.02.01 General Requirements.—Aggregates may be Inspected at the producing plant and when received on the job. Such material shall not be used until approval has been received from the Engineer. Approval of aggregates at the producing plant does not constitute a waiver of the Department's right to reject them on the job. Aggregates which have been tested and approved for use in State work shall not be used in other work. When the circumstances require that the material be sampled from the hauling unit, the Contractor shall furnish a stairway and platform to provide safe access to the material in the hauling unit.

Aggregates shall be transported from the storage site to the work in vehicles so constructed and maintained as to prevent loss, contamination, or segregation of materials after loading and measuring.

8.02.02 Testing.—Testing will be accomplished by the specific methods specified throughout the Section and by the following general methods:

Sieve Analysis of Mineral Filler	AASHTO T 37
Sieves (Square Openings)	ASTM E 11. E 323

The determination of deleterious particles will be done of accordance with Department methods.

Definitions of Terms.—Terms used in the inspection and testing of aggregates are defined as follows:

- 1. Natural Aggregates.—Natural aggregates shall be obtained from stone quarries, gravel deposits, or waste mine rock. Only such quantities of clay lumps and roots as are determined by the Engineer to have no deleterious effect upon the finished product will be permitted.
- 2. Slag Aggregates.—Slag aggregates are by-products formed in the production of iron, copper, and steel. When the word "slag" is used alone, it shall be understood to mean iron blast-furnace slag or reverberatory-furnace slag.

Iron Blast-Furnace Slag is defined as a synthetic non-metallic by-product produced simultaneously with pig iron in the blast furnace; the stag consists princtpally of a fused mixture of oxides of silica, alumina,

lime, and magnesia.

Reverberatory-Furnace Slag is defined as the nonmetallic by-product resulting from refining copper ore.

Steel-Furnace Slag is a synthetic aggregate produced as a by-product of basic oxygen, electric, or open hearth steel-making furnaces; steel furnace slag consists principally of a fused mixture of oxides of calcium, silica, iron, alumina, and magnesia. Steelfurnace slag shall meet the same gradation and physical requirements as specified for iron blast-furnace slag and reverberatory-furnace slag.

- 3. Soft Particles.—Soit particles are those particles which are structurally weak or which are found to be non-durable in service. Soft particles include shale, siltstone, friable sandstone, ochre, coal, and clayironstone, except that clay-ironstone particles will not be classified as soft particles in the 9, 25, 28, and 31 Series aggregates used for bituminous mixtures and seal coats.
- 4. Crushed Particles.-- A crushed particle is one which has at least one fractured face, except for those coarse aggregates where the size of the sieve on which the aggregate shall be retained before crushing is specified, in which case essentially all surfaces of the particle shall be fractured.

Determination of crushed particles in aggregate produced by crushing portland cement concrete will be based on the presence of broken faces on the particle and not on the fact that it is a fragment broken from concrete.

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All sandstone particles will be considered as crushed particles.

8.02.03 Coarse Aggregates for Portland Cement Concrete, No. 12 Bituminous Mixtures, and Bituminous Seal Coats.—Coarse aggregates for portland cement concrete, No. 12 bituminous mixtures, and bituminous seal coals (Michigan Series No. 6, 9, 17, 25, 26, 28, and 31) shall be obtained from natural aggregate or stag sources. Coarse aggregate produced by crushing portland cement concrete salvaged from the removal of concrete pavements, curbing, sidewalk, and similar structures from Department projects may be used in No. 12 bituminous mixtures other than top course mixtures and in portland cement concrete mixtures other than those requiring the use of 6AA aggregate.

The aggregates shall conform to the grading requirements in Table 8.02-1, the physical requirements in Table 8.02-2, and the following additional requirements.

Slag for concrete or bituminous coarse aggregate, conforming to the grading to be used in the mixture, shall have a unit weight of not less than 75 pounds per cubic foot as determined by ASTM C 29, Rodding Procedure.

Coarse aggregate produced by crushing concrete shall not be contaminated by base material picked up with the concrete. The presence of foreign materials, such as brick, wood, or plaster, in excess of 0.25 percent will be considered as evidence of contamination and shall result in rejection of the aggregate. Pieces of steel reinforcement may be present provided they pass the maximum slove size of the grading without hand manipulation. The quantity of bituminous material in the crushed concrete shall not exceed 5 percent for aggregate to be used in concrete mixtures nor 15 percent for aggregate to be used in bituminous mixtures. A fragment of crushed concrete containing some bituminous material, soft particles, or chert will be considered as if the whole fragment was composed of the objectionable material. The crushed concrete shall conform to the physical requirements shown for gravel and stone in Table 8.02-2.

8.02.04 Dénse-Graded Aggregates.—Dense-graded aggregates (Michigan Series No. 20, 21, 22, 23, and 35) shall conform to the grading requirements in Table 8.02-1, the physical requirements in Table 8.02-2, and the following additional requirements.

The 20 Series and 35A aggregates are used in bituminous

mixtures.
The 21AA, 21A, 22A, and 23A aggregates are used for

aggregate base course, aggregate surface course, aggregate shoulders, and aggregate approaches.

Dense-graded aggregate shall consist of gravel, stone, slag, or crushed concrete, in combination with fine aggregate as necessary to meet the gradation requirements.

Dense-graded aggregate produced by crushing portland cement concrete shall not contain building rubble as evidenced by the presence of more than 1.0 percent brick, wood, plaster, or similar materials. Pieces of steel reinforcement may be present provided they pass the maximum sieve size of the grading without hand manipulation. The crushed concrete shall conform to the physical requirements shown for gravel and stone in Table 8.02-2.

When producing bituminous mixtures for top courses, aggregate produced by crushing portland cement concrete will not be permitted for the portlon of the 20 Series aggregate coarser than the % inch sieve.

The portion of the 20 Series aggregates passing the 1/2 Inch sieve shall be natural sand, stone sand, slag sand, sand produced by crushing portland cement concrete, or stamp sand. Only a negligible amount of organic material will be permitted. When producing bituminous mixtures for top courses, the amount of stone sand from crushed carbonate (limestone or dolomite) sources shall not exceed 10 percent of the total weight of the aggregate in the mix.

The material shall be stockpiled in such manner that the material may be removed from the stockpile by methods which will provide aggregate having a uniform gradation.

8.02.05 Open-Graded Drainage Course (OGDC) Aggregates.—OGDC aggregates shall conform to the grading requirements in Table 8.02-1, the physical requirements in Table 8.02-2, and the following additional requirements.

OGDC aggregate shall be obtained from natural aggregate, crushed concrete, iron blast-furnace stag, or reverberatory-furnace stag sources.

Aggregate from crushed concrete shall be produced by crushing concrete salvaged from highway-type structures such as pavements, curbing, gutters, and sidewalks. The salvaged concrete shall not be contaminated by base material picked up with the concrete. Presence of brick, wood, plaster, or similar materials in excess of 1.0 percent will be considered as evidence of contamination and shall result in rejection of the aggregate. Pieces of steel reinforcement may be present provided they pass the maximum sieve size of the grading without hand manipulation.

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MATERIAL.	MSCH-	CASS	ITEM OF WORK	(8)	Seve analysis(b) (ASTM C 136) Total Peacent Passing								PERCENT LOSS BY WASHING(8)	
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		AA	5.05. 7.01, 7.03		100	95-100		30-60		0-6				1 G Russo
	•	A	7.01		1000	37 100				9-4				1 & BARRACO
	9	A	7 10	14"	100	94-100	70-60		19~35	5-15			***************************************	5.0 max
	17	A	7.01			1(0)	90-100	50-75		0-8			mn- w	1 0 mas(c)
		A	4 Q6, 7 t0, 7.11	1"									•	
COARSE MOOREGATES	25	8	4.06		1		108	95-100	<b>80-80</b>	5-30	0-12	3.0 mex(d)		
-	1	¢	4.08		1					ļ				<b>,</b>
	25	A	7.03				:00	95-100	£0.90	5-30	0-12		1 1 1	3 0 max
	28	6	4.06	:				100	95-100	25-50	0-15			3.0 mas
		C	4.06					100	85-100	20-60	0-25			3.0 mas
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	31	c	5.08, 7.11	*	1	ŀ	1	160	95-100	35-66	0-25			3.0 max(6)
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•		AA.	7.10, 7.11				100	95-100	65-90		45-65		20-40	0-7(d)
	288	A	7.10, 7.11				100		65-85		40-60		20-35	0-7(d)
	1	0	7.10, 7.11			Ì	100	-	60-90		40-65		20-40	2-10:d)
	1	c	7.10		180	80-100			55-85		30-60		15-40	0-10(d)
eren gaadig		AA.	3.01. 4.03							Ì	Ť <u>.</u>			
F4445	1 81	A	3 61, 4,63		166	85-100	'	56-79	50-75	20-45			6-26(6)1-00	

	222	A	3.81, 3.08, 3.09, 4.03	1	160	80-100		85-85	1	20-50	1 1		4.0
	23	A	3.08. 3 09		1020			80-85		25-80			4-810(eHA
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of a called accrecates	\$	6	2.08. 6.02	100			0-90		3-0				3 0 max
AGCAGGATES	ē.	EKM	2.04. 6.02	100		52-100	·	36-65	8-40		0-12	0-8	5.0 max
	34	€ .	2.C8. 8.02				100	90-100		0-5			3.0 mas

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because on any weights. The breats for Loss by Washing of dense-present appreciate are suggestions to the neutral whose percent.

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Observed Cannot or 2.0 percent permitted for material produced entirety by crushing rock, boulders, coolers, stag or concrete
Observed Cannot be letwestone or potential) appreciates stall not combine over 10 percent insoluble residue their than the No. 200 so
These used for appreciate base courses and the material is produced entirely to crushing their

[7] For appropriate special training to produced shallow material its produced entertally crustating much, boundard, cookies, stag, or concrete, the maximum hand for Loss by Weathing will be increased to 10 percent.

[8] When the of clay and set and the material is produced enterty by crustating much, boundard, cookies, stag, or concrete, the maximum hand for Loss by Weathing and shallow particles shall not exceed 10 percent.

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3.08 Aggregate Surface Courses

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5.05 Prestressed Concrete Beams

2.08 Waterproofing and Protective Cove 6.09 Understance

7.91 Portland Cer

7.03 Morter and Concrete Patching and Resurracing Mixture
7.10 Substitutes State Market

7.11 Columnia Patricing Matures

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Table 8.02-2: Physical Requirements for Coarse Aggregates, Dense-Graded Aggregates, and Open-Graded

	Ag	gregate	86							1984
				GI	IAVEL AND	STONE(	)		SLAG	(1)(2)
	MICHIGAN	GASS	Crushed Material, min (3)(4)	Loss. max, Los Angeles Abrasion (AASHTO T 96)	Soft Particles, max (3)	Chert, max (3)(5)	Sum of Soft Particles and Chert, max (3)(5)	Freeze-Thaw Durabisty, mán, (ASTM C 666, Procedure B)(5)(7)	Sum of Coke and Coal Particles, max (3)	Freeze-Thaw Durability, min. (ASTM C 656, Procedura B) (6)
	6	AA		40	2.0(6)		4.0	20	1.0	20
		Α		40	3.0(8)	7.0	9.0	20	1.0	20
	9	A	95	40	5.0				1.0	
	17	A		40	3.5(8)	8.0	10.0	20	1.0	20
		V(8)	95	49	5.0				1.0	
	25	8	50	40	5.0				1.0	
		C .		40	5.0				1.0	
	26	A		40	2.0(8)		4.0	20	1.0	20
	28	8	60	40	6.0				1.0	
	20	C	40	40	60				1.0	
	31	A(9)	95	40	5.0				1.0	
		С	95	40	5.0				1.0	
•		AAA(9)	60	40		•				
		AA(9)	40	40						
	20	A(9)	25	40						
		P		40	ļ	,				
		c		50		٠.				
-	•	AA	95	50						
	21	Α	25	50						
-	22	A	25	50						
•	23	A		50						
-	35	V(8)	60	40						
-	5	G	(10)	40(11)						
-	8	G	(10)	40(11)						
-	34	G	(10)	40(11)						

(1) All values in percent.

(2) Stag shall consist of class, tough, durable pieces, reasonably uniterm to density and quality. The aggregates shall contain as free (unhydrated) time.

Determined by dividing the weight of the particles picked by the weight of that portion of the sample from which they were salacled.

City-Ironatone particles are included in the soft particles picked for the 6. 17, and 26 Series

Clay-tronstone particles are not included in the soft particles picked for the 9, 25, 28, and 31 Serias aggregates.

(4) The percentage of crushed material will be determined on that portion of the sample retained on all sieves down to and including the 16-inch sieve for Aggregate Series 21 and 22 and including the No. 4 sieve for Aggregate Series 5, 8, 9, 20, 25, 28, 31, 34, and 35.

(5) Particles with nodules of chert will be considered as chert.

(6) Aggregates intended for use in exposed concrete will be required to demonstrate, to the satisfaction of the Engineer, adequate freeze than durability for the particular use, either by means of an extended held record of use in similar concrete which had similar exposure, or by accelerated laboratory freeze-thaw tests, or both.

(7) Where freeze-thaw durability testing results in a durability factor of lass than 40, the Engineer may impose more restrictive requirements on the soft and or check particles based on Department methods, to ensure adequate durability for the material furnished.

(8) Clay-ironstone particles shall not exceed 1.0 percent for 6AA and 26A, and 2.0 percent for 6A and

(9) Aggregate used in the production of top course mixtures shall meet the Aggregate Wear Index (AWI) specified for the roadway. The AWI established for various aggregate sources will be based on wear track testing and/or petrographic analysis of representative samples of the aggregate. The Contractor may request approval to furnish an aggregate mixture which is a blend of an aggregate having a low AWI with an aggregate having a high AWI, the mixture shall be proportioned such that the minute will have an AWI meeting, or exceeding, the AWI required for the roadway. The aggregates, the proportions to be used, and the procedures to be used for blending the aggregates shall be as approved by the Engineer.

(10) When used as Granular Blanket, aggregates 5G and 34G shall have a minimum crushed confend of 90 percent and aggregate 8G shall have a minimum crushed content of 75 percent.

[11] The abrasion requirement applies to aggregates from any source (gravel, stone, crushed concrete,

8.02.06 Granular Materials for Fill and Subbase .--Granular materials for use as fill, trench backfill, subbase and filter aggregates shall consist of sand, gravel, crushed stone, foundry sand, iron blast-furnace slag, reverberatory-furnace slag, or a combination thereof conforming to the respective requirements specified herein. Granular material used in the construction of subbase may be produced from salvaged concrete provided that it meets the grading requirements and contains only negligible steel reinforcement.

When Class II material is specified, Class I material may be substituted. When Class III material is specified, Class I or Class II material may be substituted.

Material which may be cementitious or not suitable for water percolation shall not be used. Only such quantities of shale particles as are determined by the Engineer to have no de eterious effect will be permitted.

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When used for trench backfill, no stones larger than 2 inches shall be placed within 12 inches of the pipe. Foundry sand shall be free of combustible material and may contain only negligible quantities of Iron. It shall not be used for filling over or around underdrain pipe, metal utility service pipes, or conduits.

keenen ve seed	TOTAL PENCENT PASSING:									JAIR3TAM	
TOU!	001.0M	05.0M	A.OM	41	1.1	Z	3.¥	ع.	9		
MITZA) (TIT 3	mm0č!.0	nen00.0	መመ <b>ረ</b> ፕ. Þ	लकाटे.51	menčS	annO£	ന്നമ	कक्टर	ттОСІ		
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11.0	oc-o				001-08			00 F		.ដ ១៩២	
101-0	<b>2£4</b>			OCS-12-17-1	001-08			001		.All 28.01	
181-0								001-56	00 L	lii acas	

t Besed on dry weights.

Except for use in Granular Blankets, Class IIA granular material may be substituted for Class II granular material for projects located in the follow:
Counties Arenes, Bay, Genesses, Gladwin, Huron, Lapser, Macomb, Midland, Monros, Oakland, Seginsw, Sanitac, Shuswasses, St. Clair, Tuscoles, Weyne counties.

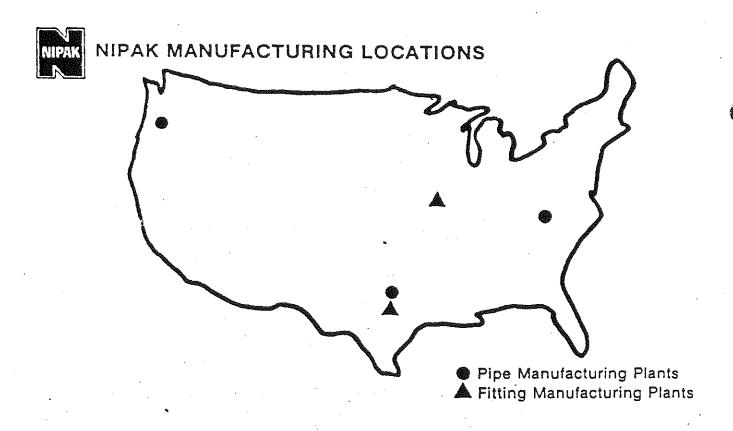
Ye de delermined on that portion of the sample which passes the 1-inch sieve.

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# Nation-wide Coverage From Convenient Plant Locations



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## Dimensions of Nipak PE 3408 High Density Polyethylene Pipe

### TABLE 2

Nominal Actual IPS Outside		SDR 7.3 (250 PSI)*			SDR 9 SDR 11 (200 PSI)* (160 PSI)			SDR 13.5 (125 PSI)*		SDR 15.5 (110 PSI)*	
Diameter (Inches)	Diameter (inches)	Minimum Wall (Inches	Weight (lb/ft)	Minimum Wall (inches)	Weight (lb/ft)	Minimum Wall (inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)
2	2.375	0.326	0.908	0.264	0.757	0.216	0.634	alianas.	4005		<b>CIII</b>
3	3.500	0.480	1.970	0.389	1.645	0.318	1.379	0.259	1.141	0.226	1.006
4	4.500	0.616	3.251	0.500	2.718	0.409	2.279	0.333	1.886	0.290	1.659
5	5.563	0.762	4.972	0.618	4.153	0.506	3.477	0.412	2.884	0.359	2.539
6	6.625	0.908	7.054	0.736	5.890	0.602	4.935	0.491	4.093	0.427	3.597
8	8.625	1.182	11.956	0.958	9.982	0.784	8.364	0.639	6.935	0.556	6.097
10	10.750	1.473	16.067	1.194	15.517	0.977	12.988	0.796	10.768	0.694	9.484
12	12.750	1.747	26.122	1.417	-21.824	1.159	18.270	0.944	15.145	0.823	13.339
14	14.000	1.918	31.492	1.556	26.313	1.273	22.017	1.037	18.268	0.903	16.072
16	16.000	****	_	1.778	34.364	1.455	28.760	1.185	23.864	1.032	20.992
18	18.000					1.636	36.382	1.333	30.192	1.161	26.568
20	20.000	-	-	_	-	1.818	44.920	1,481	37.272	1.290	32.824
22	22.000		_	_		-	-	1.630	45.122	1.419	39.714
24	24.000		_	_	_			1.777	53.694	1.548	47.232

Nominal IPS	Actual Outside	SDF (100 l		SDR 21 (80 PSI)*		SDR 26 (60 PSI)*		SDR 32.5 (50 PSI)*	
Diameter (Inches)	Diameter (Inches)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)
3	3.500	0.206	0.922	0.167	0.756		_		446
4	4.500	0.265	1.525	0.215	1.252	_		_	
5	5.563	0.327	2.327	0.265	1.908	_			
. 6	6.625	0.390	3.305	0.316	2.709	0.255	2.207	0.204	1.780
. 8	8.625	0.508	5.604	0.411	4.588	0.332	3.742	0.266	3.022
10	10.750	0.633	8.703	0.512	7.123	0.414	5.815	0.331	4.687
12	12.750	0.750	12.231	0.608	10.032	0.491	8.180	0.393	6.600
14	14.000	0.824	14.754	0.667	12.085	0.539	9.860	0.431	7.948
16	16.000	0.942	19.276	0.762	15.779	0.616	12.878	0.492	10.369
18	18.000	1.059	24.381	0.858	19.987	0.693	16.299	0.554	13.135
20	20.000	1.176	30.083	0.952	24.643	0.769	20.097	0.615	16.201
22	22.000	1.294	36.412	1.048	29.840	0.846	24.320	0.677	19.618
24	24.000	1.412	43.343	1.143	35.504	0.923	28.946	0.738	23.330
28	28.000	1.647	59.017	1.333	48.342	1.077	39.405	0.862	31.790
30	30.000	1.765	66.75	1.429	54.68	1.154	44.54	.923	35.96
32	32.000			1.524	62.22	1.231	50.73	.985	40.91
36	36.000	2.118	97.522	1.714	78.74	1.385	64.21	1.108	52.538

Standard pipe lengths: 40 feet

Nipak high density polyethylene pipe is also available in coils in lengths up to 1,500 feet in eight diameters from 1/2" CTS to 2" IPS. 3" IPS pipe is available in coils up to 1000 feet long.

Metric sizes and special sizes are available on special order.

<sup>\*</sup>Pressure rating for water at 73.4°F, based on 1600 psi long term hydrostatic strength. See Table 17, page D-2 for additional pressure ratings.

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Although polyethylene can be deflected considerably, practical limitations of circular cleaning plugs and conventions have usually limited flexible pipe to 5% deflection. Table 23 provides the maximum allowable trench loads at 5% deflection for three different soils moduli. Earth loads for other deflection percentages will be in proportion to the values in Table 23; double for 10% deflection, half for 2.5% deflection. The 700 psi soil modulus is for 90% compaction. The 300 psi soil modulus is for 65% compaction. The 200 psi soil modulus is for loose, uncompacted fill which is uniformly placed around the pipe. A comparison of these loads with the backfill load versus backfill height of Figure 3 will determine the maximum trench depth for a particular diameter of pipe and soil modulus. With 700 psi soil modulus, the thinnest wall pipe (SDR 32.5) may be used if earthloading is the only consideration. With 300 psi soil modulus, it will be necessary for diameters over 18 inch to use SDR 21 or SDR 17 pipe or limit the trench depth. For example, an SDR 32.5 pipe of 24 inch diameter would be limited to a backfill height of 16 feet. With 200 psi soil modulus, only the smallest diameter, 6 inch, can be used with the SDR 32.5 pipe to the deepest depths. If backfill heights are limited to five feet, any diameter of SDR 32.5 may be used. For a ten foot limitation, SDR 32.5 could be used for pipe up to 10 inches; SDR 26 for pipe up to 14 inches; SDR 21 for pipe up to 22 inches and SDR 17 for the next larger diameter pipe.

The deflections were calculated from the modified Spangler formula, which is the currently best documented and best known design theory for the deflection of a cylindrical horizontal pipe under earth load. The formula is:

$$y = \frac{LKW'}{2E}$$
  
3 (SDR - 1)<sup>3</sup> + 0.061 E'

where y = vertical deflection of pipe in inches

L = deflection lag factor (1.50 for polyethylene)

K = bedding constant (conservatively 0.10 though a value of .083 is specified by good backfill practices)

W' = earth load on pipe in pounds/linear inch (W' = W/12)

E = modulus of elasticity for polyethylene, psi

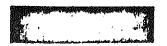
E'= modulus of soil reaction, psi

The values of 1.50 for the deflection lag factor and 0.10 for the bedding constant come from the WPCF Manual of Practice No. 9 as do the values of the compacted soil moduli. The value of 200 psi is based on our search of the literature. If the soil is compacted to ASTM D-2321 recommended practices, the bedding angle would be 180° for a constant of 0.083. The long term modulus of elasticity of the polyethylene pipe is 30,000 psi from extensive laboratory testing. Since tests show that the deflection of buried polyethylene pipe stops after one year, (the time necessary for soil consolidation to be completed), the use of the 50 year 30,000 psi modulus is very conservative.

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CHEMICAL	75 F	100 F	125 F	150 F	175 F
Acetic acid 60%	-		<u> </u>		l
Acetic acid glacial					
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Ammonium fluoride					
Ammonium hydroxide				~~~	
Ammonium nitrate			)		
Ammonium phosphate					
Ammonium sulfale	oleo-un-un-tra-				******
Ammonium sullide					*******
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Amyl alcohol		To Blanch House			
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Antifreeze /		* i risawa	-		
Antimony chloride					
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Arsenic acid		· ·			- Part - Indian
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Barium chlorida					
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Barium sulfate	Action Control of				*******
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Beeswax	-		-	·	<del> </del>
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Borax	Consequence (Consequence (Conse	0		-	******
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Butyl glycol					
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Calcium hypochlorite solution					****
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Calcium nitrate			]		******
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Citric acid					. 6000000
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Copper chloride	<b>  </b>				
Copper cyanide	}				
Copper fluoride	<b></b>				****
Copper nitrate	<u>  </u>				****
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Cyclohexanone					
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Decalin					
Detergents, synthetic					
Developers, photographic					
Destrin			Cartain mention manife		
Dextrose					
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Dibutyl phthatate			*****		
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Diethylene glycol	*********				
Dioxane					*****
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Emulsions, photographic	······································				****
Esters, aliphatic					
Ethanol	<b></b>				*****
Ether					
Elhyl acetate					
Ethylene glycol					
Ferric chloride		-			*****
Ferric nitrate					
Ferric sulfate					
Ferrous chloride					
Ferrous sulfate					*****
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Fluosilicic acid					
Formaldehyde		*******			******
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Gelatin	İ				l
Glucose					
Glycerine					
Glycol					2000000
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Hexane	<del> </del>				
Hexanol			31104-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		
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Hydrofluoric acid 60%				******	l 
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Hydrogen sulfide					
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Isopropanol			******		
Isopropyl ether					
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Lead acetate	h			***************************************	* ******
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Magnesium nitrate					
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Maleic acid					* 000 000
Menthol					
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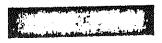
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CHEMICAL	75-F	100°F	125°F	150 F	1/31
Mercury .					*****
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Milk				-	
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Nickel sulfate			1		
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Nitric acid 30-50%		l	J		
Nitric acid 50-70%			]	]	
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Ozone		•	1		
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Petroleum ether					
Phenol					
Phosphates				1	ļ.,
Phosphoric acid					
Phosphorous oxychloride					
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Phosphorus pentoxide		T		J	.}
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Potassium bromide					
Potassium carbonate					1
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Potassium chlorate					*****
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Potassium chromate					
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Potassium ferrocyanide		<b></b>		<b></b>	
Polassium fluoride		<b></b>	<u> </u>	4	
Polassium hydroxide		<b></b>	<del> </del>	<del> </del>	
Potassium hypochlorite		<u> </u>	<u> </u>	<b></b>	
t Glassiani rijpaaniani	1				
Polassium nitrate	-	<del> </del>	<u> </u>		
Polassium perborate		<del> </del>	<del> </del>	<del> </del>	
Potassium perchlorate		ļ	<u> </u>	1	d-0050000
Potassium permanganate, 20%	ļ		<del> </del>	<b>-</b>	
Potassium persulfate		<u> </u>		<del></del>	•••••
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Potassium sulfate		<del> </del>		-	******
Potassium sullide				<u> </u>	
Propyl alcohol		-	<del></del>	<del></del>	*****
Propylene glycol		1	_	-	*******
Prussic acid			<u>.</u>		4.000
		1	Wales		1
Salicylic acid		-	<del>-</del>		*******
Sea water	· Company	_		-	
Selenic acid	-		<u> </u>		
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Silicone oil	***************************************	************		┫	******
Silver acetate				<del></del>	
Silver cyanide	<b></b>		_	1	1
Silver nitrate				1	<b></b>
Soap solutions		<del></del>	+	1	
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### **TABLE 24 continued**

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Zinc sullate	Zinc sulfate	<b></b>		<b>  </b> .	

Acceptable
Conditional depending on

# NON Conveyable Chemicals in Polyethylene Pipe

Aqua Regia Bromine, gas Bromine, liquid Carbon disulfide Carbon tetrachloride Chlorine, gas Chloroform Fluorine Nitric acid, above 70% conc. Ozone Sulfuric acid, furning Sulfur trioxide Thyonil chloride Toluene Trichloroethylene Xylene

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# product description CONTINUED

Reducer / Cleaner: XYLOL, R2 K 4
→ ★ Life: 36 months (unopened)
Shipping Weight: 1 gal.—13.3 $\pm$ .1 lbs.; 5 gal.—66.2 $\pm$ .1 lbs.
ANALYSIS: Pigment by weight: 41.4%
Red Lead
Natural Iron Oxide 6.9%
Calcium Carbonate
Silicates
Tinting Pigment Present
Vehicle by weight: 58.6%
Chlorinated Rubber 11.7%
Aromatic Solvent
Chlorinated Waxes 9.9%
Aliphatic Solvent
Other

Limitations: HI-BILD Chlorinated Rubber Primer is not resistant to most solvents, animal and vegetable oil and fats common in dairies, packing houses and sewage treatment facilities.

PRECAUTIONS: FLAMMABLE, VAPOR HARMFUL, CON-TAINS LEAD.

Surface Preparation and Priming: All surfaces must be dry and free of oil, grease, dirt, rust or other "rface contamination.

.ranized from and Aluminum: Not applicablesee Data Page E-14.

Masonry: Not applicable—see Data.Page E-14.

Steel/Iron: Minimum surface preparation is Power Tool Cleaning per SSPC-SP 3-63. For severe exposure or immersion service, blast steel to White Metal Blast per SSPC-SP 5-63. Prime with HI-BILD Chlorinated Rubber Primer the same day and follow with the recommended number of topcoats.

Previously Painted Surfaces: (Not for Immersion) HI-BILD Chlorinated Rubber Primer is not recommended for application over other prime coats or enamels unless they are dried and hardened. If lifting occurs (test a small area), the old paint must be removed or apply a coat of KEM KROMIK® Metal Primer, B50 N 2 or B50 W I as a barrier coat.

Application: Apply HI-BILD Chlorinated Rubber Primer directly to all properly prepared iron and steel

Mixing and Application: Mix paint thoroughly by boxing and stirring. May be applied by conventional or airless soray. Brush application should be limited to small areas. Be sure to coat thoroughly all welds, corners, etc. Apply at temperatures above 40°F, and relative humidity of less than 85%. Substrate temperatures must be 5°F, above dew point.

Brush (small areas only):

Reduce with up to 1 pint XYLOL per gallon if neces-

unventional Spray: fluid pressure 15 psi Sun ......Devilbiss KGA 502 

Reduction . . . . . . Up to 1 pt./gal. XYLOL, R2 K 4 Airless Spray: Pump (Minimum) ......SHERWIN-WILLIAMS Super Stinger® 1 pt./gal XYLOL, R2 K 4

Cleanup Information: Clean equipment with XYLOL, R2 K 4 following suppliers safety recommendations.

### HI-MIL SHER-TAR™ EPOXY ENAMEL Part A, B69 B 40 Part B, 860 Y 40

### PRODUCT DESCRIPTION

A one coat, high build polyamide cured coal tar epoxy enamel.

### lises:

- · Heavy duty structural protection.
- Nonpotable water tank and pipe coating
- Liner for sewage treatment tanks and equipment
- Use one coat where 2 coats of standard coal tar are normally specified
- Concrete and steel structures. No primer or topcoat required
- · Protection against splash and spillage of a wide
- variety of chemicals Hi-Mil Sher-Tar is recommended for:

penstocks dam gates sewage treatment underground tanks equipment plating operations offshore rigs canal linings chemical plants

paper mills salt and fresh water crude oil storage

zones

### Performance Information:

### Physical Properties:

tidal and splash

- (ASTM D4060, CS17 Wheel, 1000 cycles, 1 kg.
- (ASTM D1737, 180° bend, ¼ " mandrel)
- (ASTM D3363)
- Direct impact ......>80 in. lbs. (ASTM G14)
- Moisture condensation resistance, 100°F., 1000 hours . . . . . . No failure (ASTM D1735)
- Salt Fog resistance, 1000 hours . . . . . Excellent (ASTM B117)
- Thermal shock, 250 cycles . . . . . . . . Excellent (ASTM D1211) · Meets performance requirements of DOD-P-

23236A, (Replaces MILP-23236) Type 1, Class 2 Chemical Resistance Guide (ANSI N5.12): Consult your Sherwin-Williams representative for specific application and performance recommendations.

### Immersion Resistance:

- · Aliphatic hydrocarbon solvents, gasoline, kerosene, fuel oil, sour crude oil
- Lubricating oils, cutting oil, animal and vegetable oils and fats
- Alkalies
- Fresh water and sea water

### Resistance to Furnes, Splash and Spillage:

- · Weak solutions of mineral and organic acids: SEVERE
- Aromatic hydrocarbon solvents: MODERATE
- · Glycol ethers, alcohols, selected hydrocarbon solvents, formaldehyde: SEVERE

### CHARACTERISTICS

Finish: Semi-Gloss

Color: Black

Spreading Rate: 55 sq. ft. per gal. (theoretical-no loss\*): @ 28 mils wet

\*Allow for application losses and surface irregularities when determining working requirements.

Recommended: 28 mils wet/coat

Film Thickness (spray): 20 mils dry/coat

Spreading Rate Coverage @ 1.0 mil dry (theoretical, calculated): 1140 sq. ft. per gal.

Volume Solids: 71% ±2%

Weight Solids: 80% ± 2°

Application Conditions: Temperature (air surface, material): 55°F, minimum, 100°F, maximum.

Relative Humidity: 90% maximum

Substrate Temperature: 5°F. above dew point Drying Schedule (temperature dependent) @ 77° & 50% RH @ 28 mils wet: To Touch: 8-10 hours. To Handle: 48 hours, To Recoat: 18 hours min.

Requires minimum 7-10 days cure before placing in service.

Pot Life: @ 70°F.: 4 hours., @ 100°F.: 1 hour Curing Mechanism: Crosslink polymerization

Flash Point (catalyzed), Pensky-Martens closed cup): 110°F.

Reducer/Cleaner: Reducer #54, R7 K 54

Shelf Life: Minimum 12 months (unopened) Packaging:

Part A: 3 gal. per 5 gal. pail Part 8: 1 gal. can.

Weight/Sal. (catalyzed): 10.4 ± .1 lbs./gal.

Shipping Weight: 46.5 lbs./4 gal.

Application: Conventional and airless.spray

### ANALYSIS (MIXED):

Pigment by weight: 24%	
Silicates	21%
Silica	3%
Vehicle by weight: 76%	
Polyamide Resin	11%
Epoxy Resin	14%
Coal Tar	27%
Lecithin	2%
Aromatic Hydrocarbon	19%
Alcohols	3%
Totals	100%

PRECAUTIONS: B69840, COMBUSTIBLE B60V40, COMBUSTIBLE—VAPOR HARMFUL

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# APPLICATION GUIDE

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FERRIC NITRATE FERROUS CHLORIDE FERROUS SULFATE FLUOSILICIC ACID FLUOSILICIC ACID FORMALDEHYDE, 40% FORMIC ACID FREON 12 (WET) FUEL OILS FURFURAL GASOLINE GLYCERINE (GLYCEROL) HEYANE HEXANE HYDROBROMIC ACID, 20% HYDROCHLORIC ACID, 0-25% HYDROCHLORIC ACID, 10% HYDROFLUORIC ACID, 10% HYDROFLUORIC ACID, 20% HYDROFLUORIC ACID, 20% HYDROFLUORIC ACID, 20% HYDROFLUORIC ACID, 50% HYDROGEN PEROXIDE, 30% HYDROGEN PEROXIDE, 30% HYDROGEN PEROXIDE, 30% HYDROGEN SULFIDE, AOLSOL WETONES LACTIC ACID LEAD ACETATE LUBRICATING OIL MAGNESIUM NITRATE MAGNESIUM SULFATE MICKEL CHLORIDE METHYL ETHYL KETONE METHYL ETHYL KETONE METHYL ETHYL KETONE METHYL ETHYL KETONE METHYL ETHYL KETONE METHYL ETHYL KETONE MICKEL CHLORIDE MICKEL CHLORIDE NICKEL SULFATE NITRIC ACID, 10% NITRIC ACID, 50% NITRIC ACID WENOL	AACECEBEDBACAAACEE	AAAAXDACBXXBABCBAAXXXXDCXXAXAXXAAXAAABXXCB	***  **  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  **  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  **  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  ***  **  ***  ***  **	BAED8BABEABAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	AAAAAEEAAXAAAAAABBBBBAAAAAAAAAAAAAAAAAA	AAAABBAADAEEADADAAXAAEADDEAEEEEEAAAXAAAAAAAAAA	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	A E E D E

SYMBOL IDENTIFICATION

A - Excellent
B - Good
C - Good to 80°F

D - Moderate effect
(use under limited conditions)

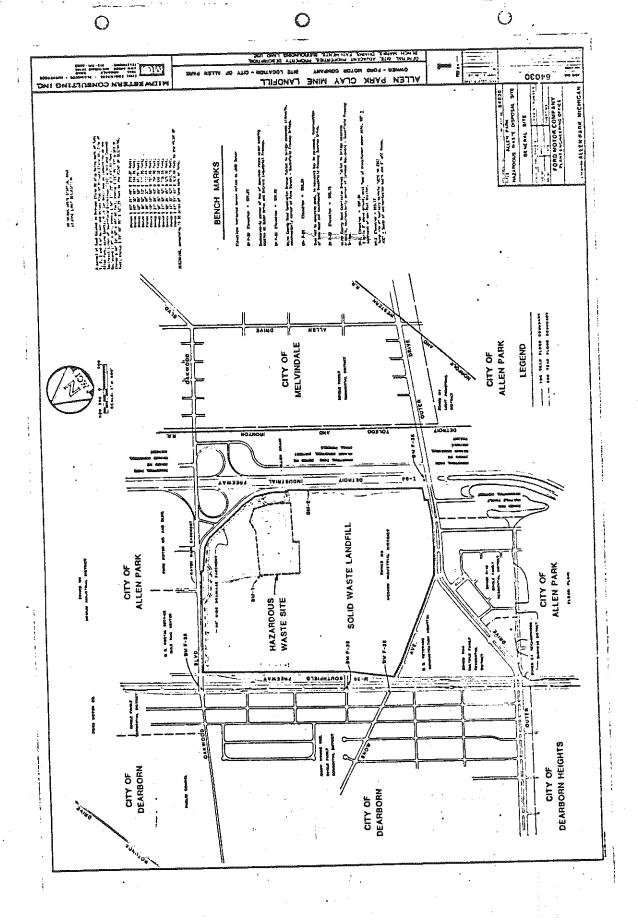
F - Autocatalytic X - Unknown

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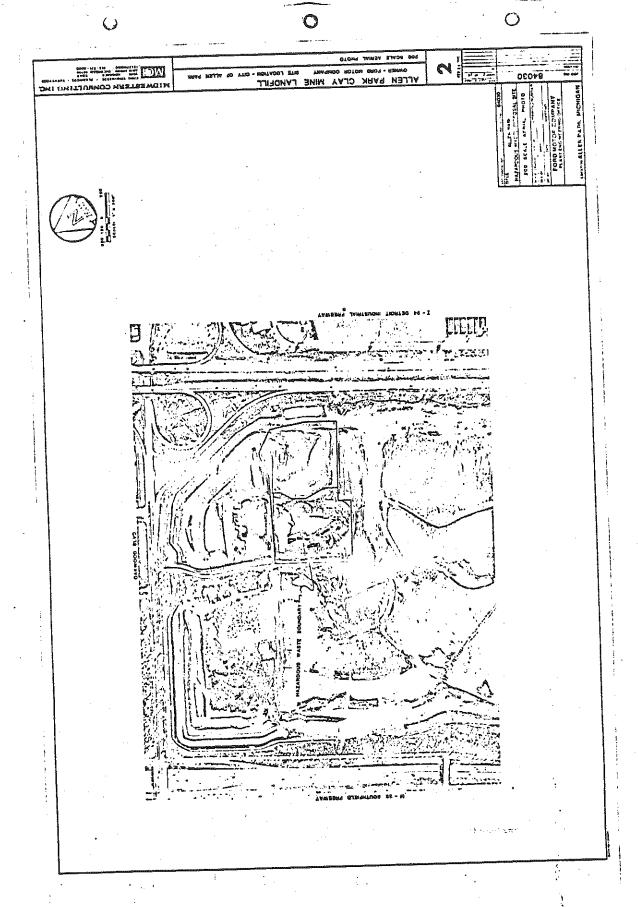
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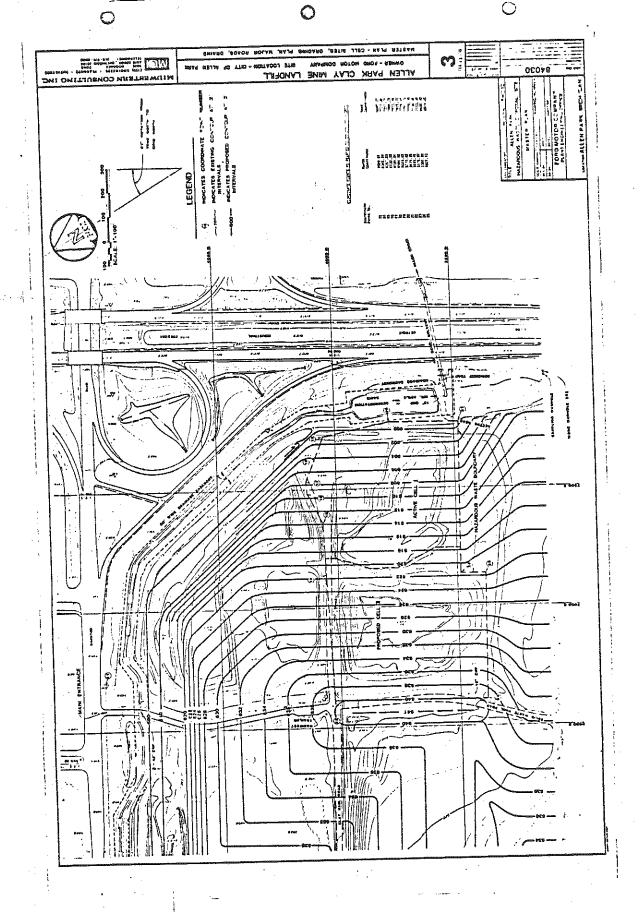
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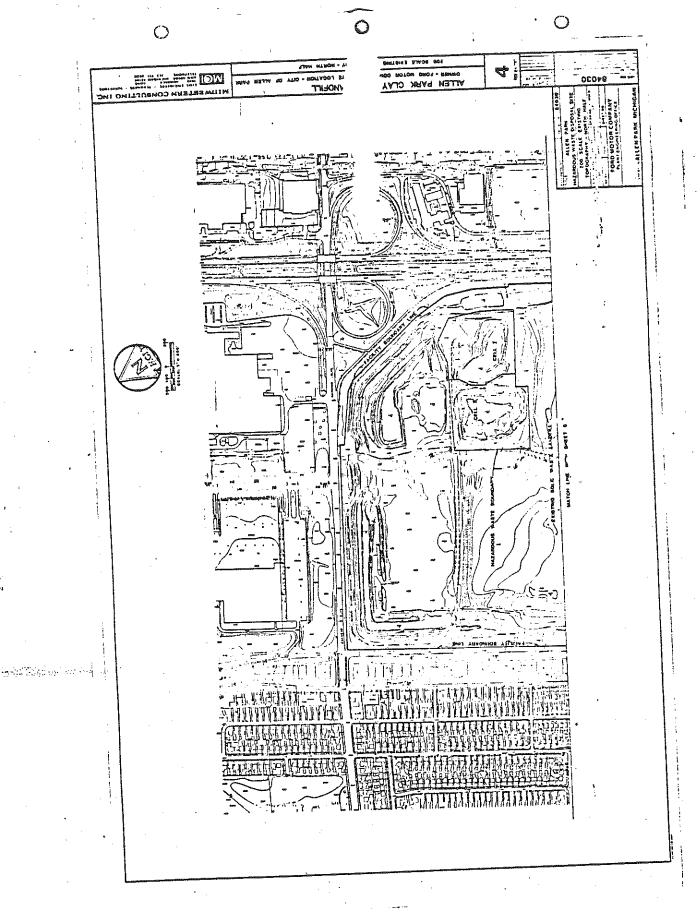


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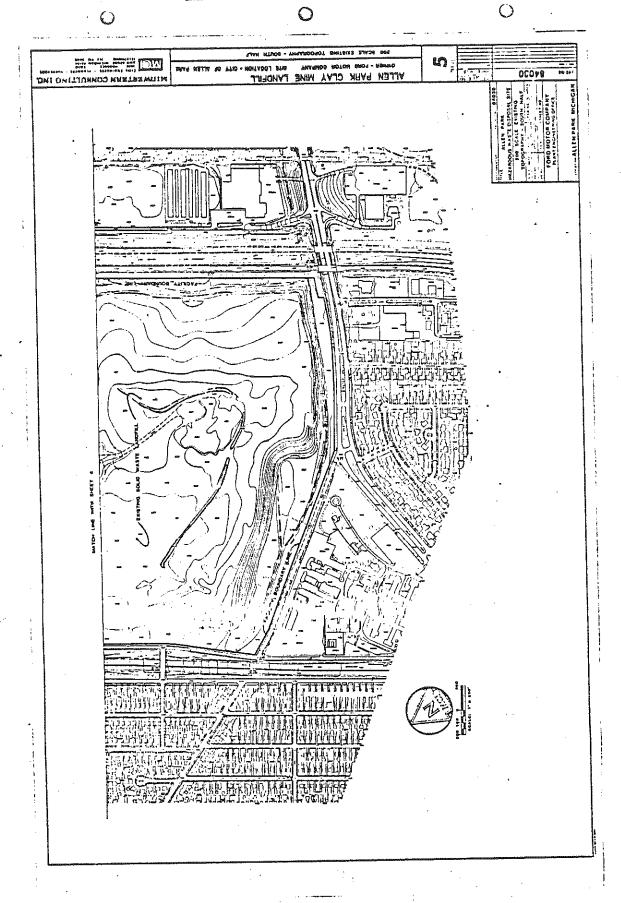


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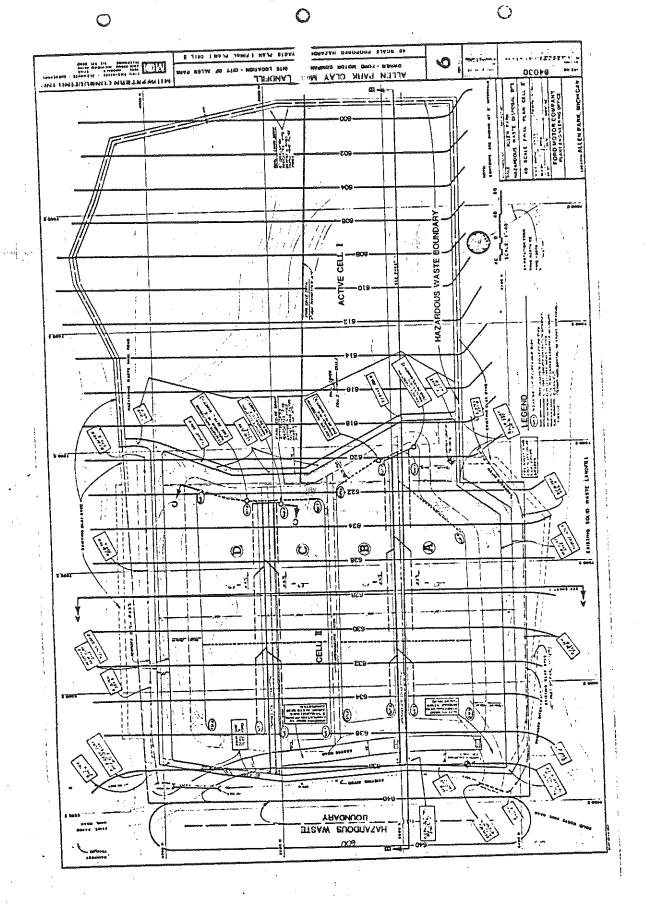




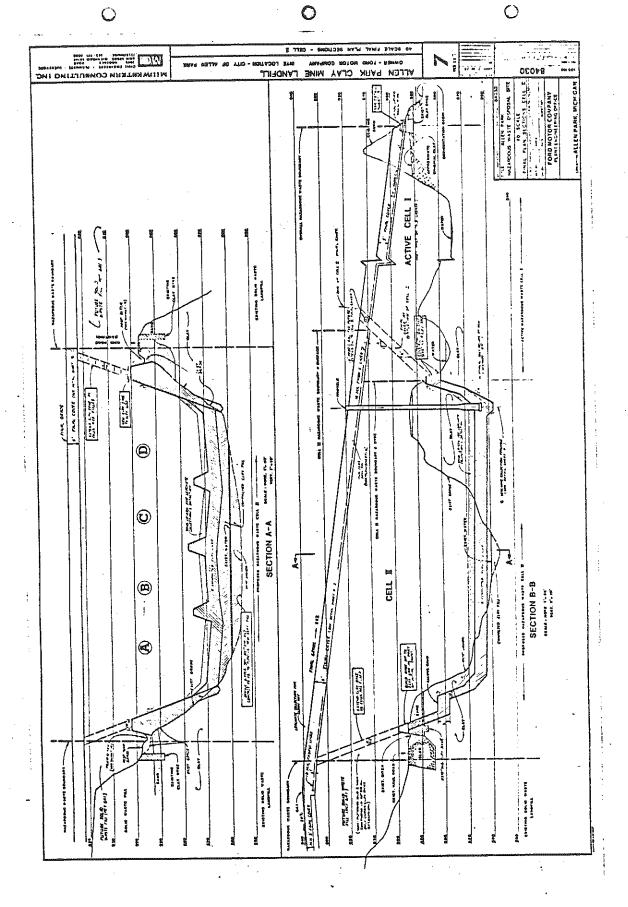
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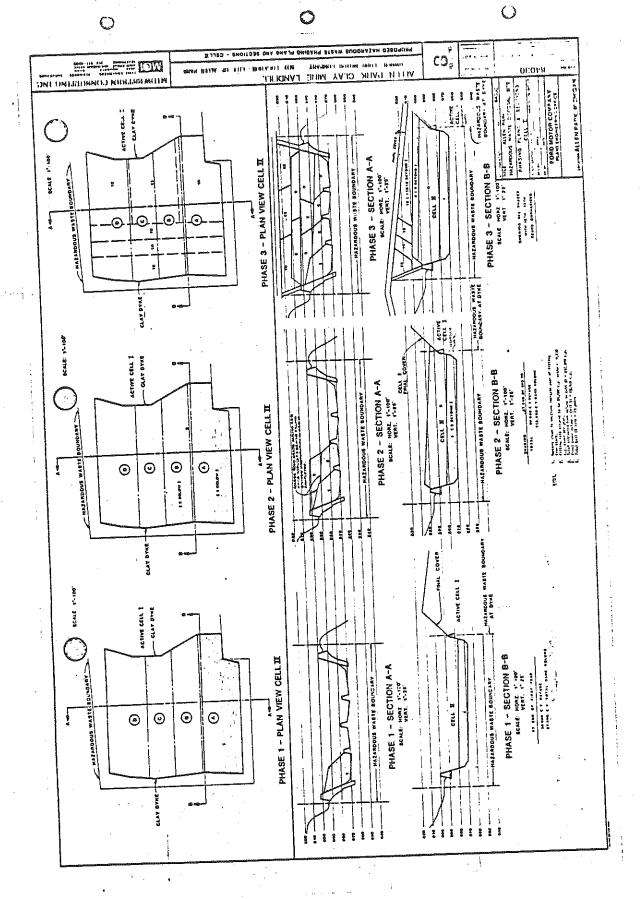
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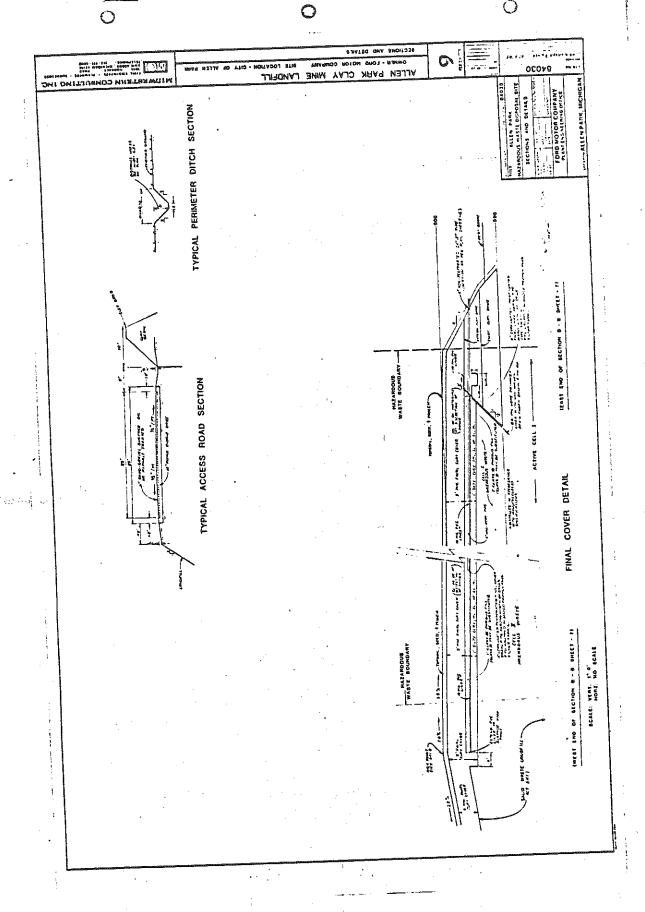
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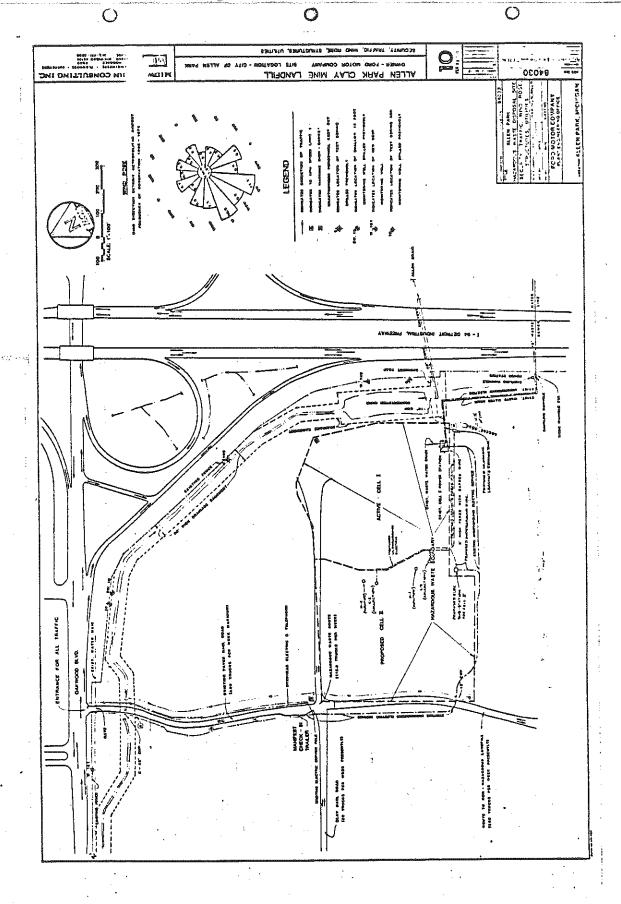
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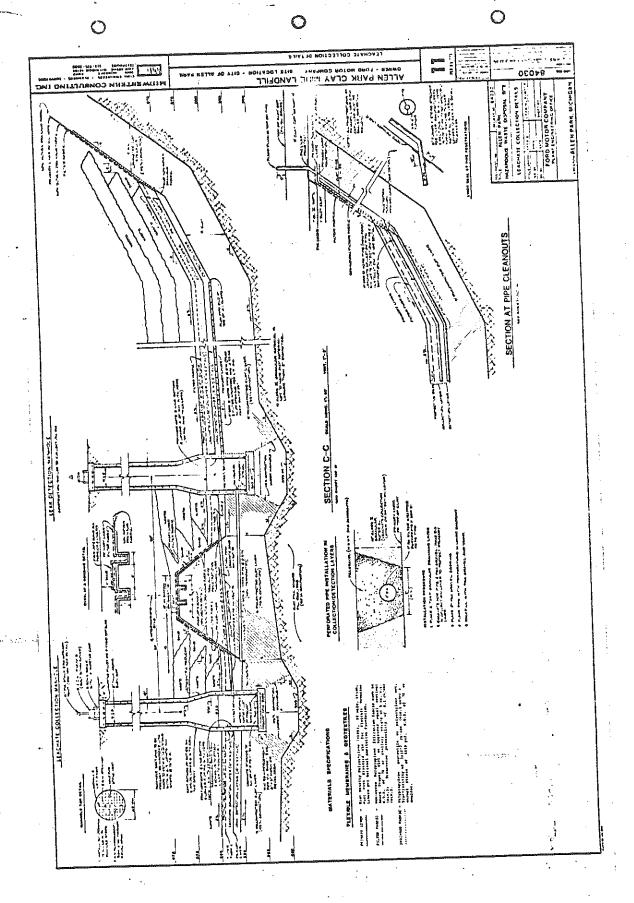
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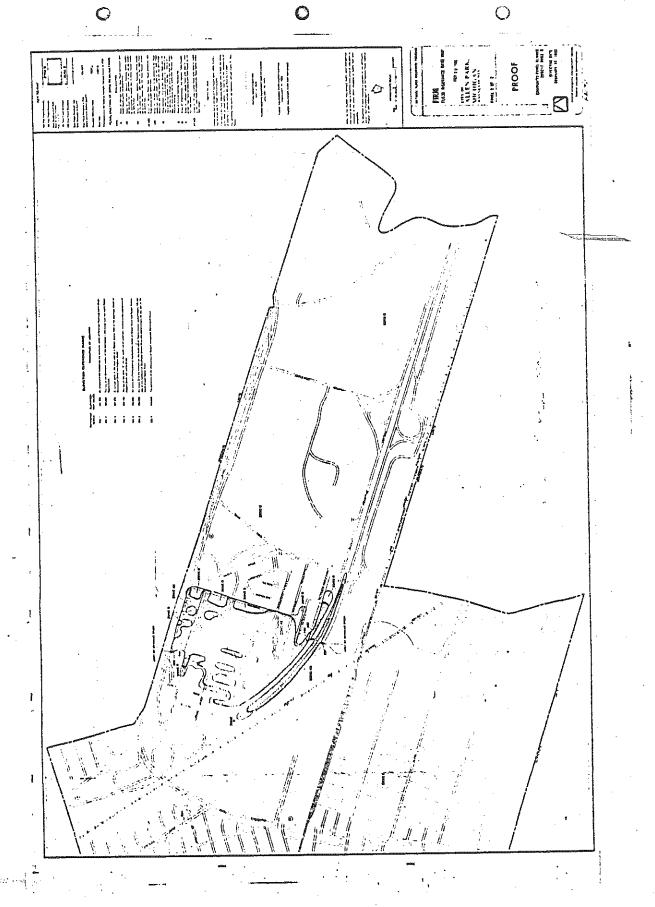
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- 6. Storm Water Insure that storm water collected in the inactive areas does not come in contact with active work areas. Inspect integrity of diversion berms in the cell in order to maintain separation of active from inactive work areas. Inspect run-on and run-off diversion berms and dikes for erosion or general damage that would allow water into the waste management area.
- 7. Leachate System Inspect record and sample the following system components.
  - a) Primary and Secondary Pump Systems.
    - 1. Switching mechanisms operable.
    - 2. Pumps operable.
    - 3. Verify liquid volumes in sump.
  - b) Primary Leachate Holding Tanks.
    - 1. Monitor secondary containment.
    - 2. Monitor leachate volume.
    - 3. Sample leachate (if necessary).
  - c) Secondary Holding Tanks
    - 1. Monitor liquid volume.
    - 2. Sample and analyse liquid (if necessary).
  - d) Discharge Lines.
    - 1. Inspect for damage (clean-outs)
  - e) Sampling Manhole.
    - 1. Proper flow recording.
    - 2. Proper leachate discharge.

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- 8. Bulldozer Insure bulldozer is operable.
- 9. Telephone Insure operation of phone.

### Weekly Items

- 1. Fire extinguishers Check the availability and pressure gauges on the fire extinguishers. Extinguishers are in Manifest Trailer and mobile operating equipment.
- 2. Gauze Masks Verify that the gauze masks are available.
- 3. Perimeter Fence Look for locations where the fence is in disrepair.
- 4. Surface Drains Look for blocked drainage and surface water contamination.
- 5. Sediment Basin Check the outflow for blocked drainage and surface water contamination.
- Intermediate cover Inspect all fill areas that do not have final cover to insure that intermediate cover is adequate. Inspect for erosion or other damage that could or has exposed wastes.

#### Quarterly Items

- Monitor Wells Inspect integrity of protective casings, including caps and locks.
- 2. Final cover Inspect all areas which have received final cover for deep rooted vegetation, deterioration of vegetative cover, areas of surface erosion and other surface disturbances.
- Fire Hydrant Inspect for vandalism.

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### G-4n Landfill Leakage 40 CFR 264.52

Due to artesian conditions at the site (refer to Attachment 15), groundwater is expected to flow into the secondary collection system at the rate of 50-100 gallons per day. Should the primary liner fail, the secondary collection system combined with the site hydrogeological characteristics will prevent migration of the leachate into the underlying aquifer. Under such conditions, there is no need to notify the administrator, take remedial action, nor enact a groundwater detection program.

### G-5 Emergency Equipment and Power Sources 40 CFR 264.52(e)

Fire Extinguishers

- l for gas, oils, solvents, located at office trailer.
- l for liquids, electrical, combustibles, located at office trailer.
- l for liquids, electrical, combustibles,
   located at bulldozer.

Caterpillar D-7

 Wide-track bulldozer for spill containment, etc.

Telephone

- Tocated at office trailer.

Fire Hydrant

- Located north of entrance gate.

Misc. Mobil Equipment

 Available at the Ford Rouge Plant upon request (front endloaders, vacuum truck, etc.).

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#### Post-Closure Plan 40 CFR 270.14(b)(13) $\mathbb{I}$ -2

## Ford Allen Park Clay Mine

### Landfill Post-Closure Plan

### March 1, 1985

Site Name:

Ford Motor Company Allen Park Clay Mine

Site I.D. #:

MID 980568711

Owner's Name:

Ford Motor Company

Site Address: 17250 Oakwood Blvd., Allen Park, Michigan 48101

Telephone:

(313) 336-5725

Contact:

J. S. Amber

15201 Centry Drive

Dearborn, Michigan 48120

(313) 322-4646

#### Facility Inspection Plan 40 CFR 270.17(g) I-2a

Inspection logs are to be kept that indicate, frequency and inspection procedures, which are explained below.

- 1. Security Control: Fencing, gates, locks, and warning signs are to be inspected for vandalism and disrepair on a weekly basis.
- 2. Leachate Collection Systems: The pumps, switch mechanisms, discharge lines, holding tanks and power supply are to be inspected on a weekly basis until leachate is no longer detected. At such time inspections are to be made monthly until leachate is no longer generated. The inspection shall include:

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# I-2a <u>Facility Inspection Plan</u> 40 CFR 270.17(g) (cont'd)

- obstructions, or damage to the discharge pipes in the cover drainage layer.
- .. burrowing by animals.
- surface disturbance due to excavation or unwarranted vehicle traffic.

Such inspections should be performed quarterly, because erosion damage and priblems with cover require several months to develop.

4. Well Condition: Inspection of the monitor wells should include noted evidence of vandalism or disrepair such as broken caps, corrosion of casing, displacement of annular seal, etc. on a quarterly basis consistent with present active operating procedure.

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# I-2a Facility Inspection Plan 40 CFR 270.17(g) (cont'd)

- 2. Leachate Collection Systems: (cont'd)
  - a) Primary and Secondary Pump Systems.
    - 1. Switching mechanisms operable.
    - 2. Pumps operable.
    - 3. Verify liquid volumes in sump.
  - b) Primary Leachate Holding Tanks.
    - 1. Monitor liquid volume.
    - 2. Sample and analyze liquid (if necessary).
  - c) Secondary Holding Tanks.
    - 1. Monitor liquid volume.
    - 2. Sample and analyze liquid (if necessary).
  - d) Discharge Lines.
    - 1. Inspect for damage (clean-outs).
  - e) Sampling Manhole.
    - 1. Proper flow recording.
    - 2. Proper leachate discharge.
  - 3. Damage to Cover and Drainage:

Inspections will be directed toward the identification of:

- . invasion of undesirable plant species (deep rooted plants such as woody plants).
- . deterioration of vegetative cover.
- . disruption of drainage grades due to settlement.
- . soft, wet, or unstable areas of the cover.
- . areas of surface erosion.

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Ford Motor Company

Dearborn, Michigan 48121
No November 9, 1984

WASTE MANAGEMENT BRANCH

Attention: 5HW-13 U. S. Environmental Protection Agency Region V 230 South Dearborn Street Chicago, IL 60604



Subject: Notice of Deficiency - RCRA Part B Application EPA, REGION V

Ford Allen Park Clay Mine

E.P.A. I.D. No. MID ORGE COMMING.

Attention: 5HW-13:

Enclosed are four copies of amended or supplemental information to be inserted into our original RCRA Part B Application, as filed with EPA for the subject facility. Per your request, the following directions explain which original pages are to be removed or replaced and which amended or supplemental pages are to be included into the application. A copy of the deficiency letter is provided for reference.

## 270.14(b)(3)

Replace pages 93-98 with pages 93A-98A. Note that sampling methods have been specified from 40 CFR Part 261, Appendix I.

## 270.14(b)(5)

Replace pages 273 through 275 and page 285 with pages 273A through 275A and page 285A.

## 270.14(b)(10)

Replace pages 62 and 63 with pages 62A and 63A. Insert pages 70.01A through 70.11A between pages 70 and 71.

# 270.14(c)(2)

Replace page 211 with page 211A and insert page 267.1A.

COPY

U. S. Environmental Protection Agency November 9, 1984 Page 2

#### 270.21(b)(1)

A liner engineering report utilizing a synthetic membrane has been initiated and will be completed as soon as possible. Per discussions with Mr. Joe Boyle of EPA Region V staff, I understand the due date for submittal of this report will be extended until January 31, 1985, because of the additional field work required. Compatibility test work will commence as soon as the liner engineering report permits, with the resulting data and liner selection to be made available to your office immediately thereafter.

#### 270.21(b)(5)

Insert pages 162.1A and 162.2A after page 162.

Yours very truly,

Ben C. Trethewey, Manager Mining Properties Department

Attachment

cc: Mr. Alan J. Howard, MDNR

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#### NOTICE of DEFICIENCY

## FORD MOTOR COMPANY ALLEN PARK CLAY MINE MID 980568711

- 270.14(b)(3) The waste analysis plan does not specify sampling methods taken from 40 CFR Part 261, Appendix 1.
- 270.14(b)(5) The inspection schedule does not address inspection of emergency equipment which is identified in the contingency plan.
- 270.14(b)(10) The application does not describe load bearing capacity and surfacing of all access roads to the point of disposal.
- 270.14(c)(2) Exhibit H of the application indicates the presence of a water table within the shallow sand layer near the surface at wells W-102 and W-103. However, the application does not provide identification of this uppermost aquifer, including groundwater flow direction and rate, and the basis for such an identification.
- 270.14(c)(3) The application does not describe a proposed point of compliance or the information required by (c)(2) in the manner required.
- 270.14(c)(4) The application does not address whether any plume of contamination has entered the groundwater from a regulated unit. Note that "ground water" means water below the land surface in a zone of saturation (260.10).
- 270.14(c)(5) The application does not contain detailed plans and an engineering report, certified by a registered professional engineer describing a proposed ground water monitoring system to be implemented to meet the requirements of 264.97. See comment for 270.14(c)(2).
- or (7) or (8) The information does not contain sufficient information, supporting data, and analyses to establish either a detection monitoring program, a compliance monitoring program, or a corrective action program (depending on current groundwater quality between the proposed point of compliance and the property boundary).
- The application does not contain detailed plans and an engineering report, certified by a registered professional engineer, which describes a liner that is designed, constructed, and installed to prevent any migration of wastes out of the landfill to the adjacent subsurface soil at any time during the active life of any portion of the landfill that is not an existing portion. The application incorrectly construes the adjacent soil (i.e. the limit of the excavation) to be the "liner". Since a landfill liner must be constructed of materials that prevent wastes (e.g. leachate) from passing into itself during the active life of the facility, the gray silty clay unit is not acceptable as a liner. Other obstacles

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to this concept include the inability to establish quality control during installation, and the inability to cover all surrounding earth likely to be in contact with the waste or leachate.

270.21(b)(5) The application does not contain detailed plans and an engineering report, certified by a registered professional engineer, describing control of wind dispersal of particulate matter.

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#### Ford Motor Company Allen Park Clay Mine

#### MID 980568711

#### Waste Analysis Plan

Hazardous Waste Name:

Electric Arc Furnace Bagnouse Dust

EPA I.D. Number:

K061

Line Number on Part A Application:

1

Detailed Analyses:

Refer to Attachment 9

Method of Disposal:

Landfill

Sample Method:

ASIM D346-75, ASIM D420-69, ASIM D140-70, ASIM D2234-76

Analytical Parameters, Frequency, Rationale, Method:

Chromium, Cadmium, Lead - Analyze yearly, verification of hazardous classification, EP Toxicity (40 CFR 261, Appendix II).

Color - Verify each load, characteristic red, visual comparison.

Particle Size - Verify each load, characteristic particle size (dust), visual comparison.

Density - Analyze yearly, characteristic of waste, ASIM P212-76.

Bearing Strength - Analyze yearly, characteristic of waste, ASIM D-2435, D-2166.

Compatibility - Analyze yearly, assure integrity of leachate collection system and verify that waste mixtures do not generate harmful heat, gas, or explosions, mix materials together and note observations.

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#### Ford Motor Company Allen Park Clay Mine

#### MID 980568711

#### Waste Analysis Plan

Hazardous Waste Name:

Decanter Tar from Coking Operations

EPA I.D. Number:

K087

Line Number on Part A Application:

2

Detailed Analyses:

Refer to Attachment 9

Method of Disposal:

Landfill

Sample Method:

ASIM D140-70 for extremely viscous liquids

Analytical Parameters, Frequency, Rationale, Method:

Phenol - Analyze yearly, verification of hazardous classification, SW-846 (8040).

Naphthalene - Analyze yearly, verification of hazardous classification. SW-846 (8100).

Color - Verify each load, characteristically black, visual comparison.

Odor - Verify each load, characteristic smell, visual comparison.

Free Liquids - Inspect each load, free liquids not acceptable, visual observation.

Density - Analyze yearly, characteristic of waste, ASIM D-891.

Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166.

Compatibility - Analyze yearly, assure integrity of leachate collection system and verify that waste mixtures do not generate harmful heat, gas, or explosions, mix materials together and note observations.



#### MID 980568711

#### Waste Analysis Plan

Hazardous Waste Name:

Wastewater Treatment Sludge from Electroplating Operations

EPA I.D. Number:

F006

Line Number on Part A Application:

3

Detailed Analyses:

Refer to Attachment 9

Method of Disposal:

Landfill

Sample Method:

ASIM D140-70 for extremely viscous liquids. ASIM D1452-65 for soil-like material

Analytical Parameters, Frequency, Rationale, Method:

Color - Verify each load, characteristically blue-green, visual comparison.

Odor - Verify each load, no characteristic smell, visual comparison.

Free Liquids - Inspect each load, free liquids not acceptable, visual observation.

Density - Analyze yearly, characteristic of waste, ASTM D-891.

Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166.

Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials, and note observations.

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#### MID 980568711

#### Waste Analysis Plan

Hazardous Waste Name:

EP Toxic - Cadmium

EPA I.D. Number:

D006

Line Number on Part A Application:

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Detailed Analyses:

Refer to Attachment 9

Method of Disposal:

Landfill

Sample Method:

ASTM D140-70 for extremely viscous liquids. ASTM D346-75 for crushed or powdered material. ASTM D1452-65 for soil-like material. ASTM D2234-76 for fly ash-like material.

Analytical Parameters, Frequency, Rationale, Method:

Cadmium - Analyze yearly, verification of hazardous classification, EP toxicity (40 CFR 261, Appendix II).

Color - Verify each load, characteristic color, visual comparison.

Odor - Verify each load, no characteristic smell, visual comparison.

Free Liquids - Inspect each load, free liquids not acceptable, visual observation.

Density - Analyze yearly, characteristic of waste, ASTM D-891.

Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166.

Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials, and note observations.

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#### MID 980568711

#### Waste Analysis Plan

Hazardous Waste Name:

EP Toxic - Chromium

EPA I.D. Number:

D007

Line Number on Part A Application:

h

Detailed Analyses:

Refer to Attachment 9

Method of Disposal:

Landfill

Sample Method:

ASIM D140-70 for extremely viscous liquids. ASIM D346-75 for crushed or powdered material. ASIM D1452-65 for soil-like material.

ASIM D1452-65 for soil-like material. ASIM D2234-76 for fly ash-like material.

Analytical Parameters, Frequency, Rationale, Method:

Chromium - Analyze yearly, verification of hazardous classification, EP toxicity (40 CFR 261 Appendix II).

Color - Verify each load, characteristically black, visual comparison.

Odor - Verify each load, characteristic smell, visual comparison.

Free Liquids - Inspect each load, free liquids not acceptable, visual observation.

Density - Analyze yearly, characteristic of waste, ASTM D-891.

Bearing Strength - Analyze biannually, provision for waste stabilization, ASIM D-2435, D2166.

Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials, and note observations.

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#### MID 980568711

#### Waste Analysis Plan

Hazardous Waste Name:

EP Toxic - Lead

EPA I.D. Number:

B000I

Line Number on Part A Application:

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Detailed Analyses:

Refer to Attachment 9

Method of Disposal:

Landfill

Sample Method:

ASIM D140-70 for extremely viscous liquids. ASIM D346-75 for crushed or powdered material. ASIM D1452-65 for soil-like material. ASIM D2234-76 for fly ash-like material.

Analytical Parameters, Frequency, Rationale, Method:

Lead - Analyze yearly, verification of hazardous classification, EP toxicity (40 CFR 261 Appendix II).

Color - Verify each load, characteristically black, visual comparison.

Odor - Verify each load, characteristic smell, visual comparison.

Free Liquids - Inspect each load, free liquids not acceptable, visual observation.

Density - Analyze yearly, characteristic of waste, ASTM D-891.

Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166.

Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials and note observations.

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- 6. Storm Water Insure that storm water collected in the inactive areas does not come in contact with active work areas. Inspect integrity of diversion berms in the cell in order to maintain separation of active from inactive work areas. Inspect run-on and run-off diversion berms and dikes for erosion or general damage that would allow water into the waste management area.
- 7. Leachate System Inspect the sampling manhole for proper flow recording and leachate sampling. Verify that system is in operating order and that monitor equipment is functioning. Inspect leachate discharge lines for damage or leakes especially the integrity of the clean out pipes. Check for vandalism of the electrical control boxes and the locks on the manhole covers.
- 8. Bulldozer Insure bulldozer is operable.
- 9. Telephone Insure operation of phone.

#### Weekly Items

- 1. Fire Extinguishers Check the availiability and pressure gauges on the fire extinguishers. Extinguishers are in Manifest Trailer and mobile operating equipment.
- 2. Gauze Masks Verify that the gauze masks are available.
- 3. Perimeter Fence Look for locations where the fence is in disrepair.
- 4. Surface Drains Look for blocked drainage or surface water contamination.

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#### Weekly Items (cont'd)

- 5. Sediment Basin Check the outflow for blocked drainage and surface water contamination.
- 6. Intermediate cover Inspect all fill areas that do not have final cover to insure that intermediate cover is adequate. Inspect for erosion or other damage that could or has exposed wastes.

#### Quarterly Items

- Monitor Wells Inspect integrity of protective casings, including caps and locks.
- 2. Final cover Inspect all areas which have received final cover for deep rooted vegetation, deterioration of vegetative cover, areas of surface erosion and other surface disturbances.
- 3. Fire Hydrant Inspect for vandalism.

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# HAZARDOUS WASTE GENERAL INSPECTION SCHEDULE AND CHECKLIST FORD MOTOR COMPANY - ALLEN PARK CLAY MINE LANDFILL MID980568711

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(	<b>)</b>	Refer	to	backside	for	notations	and	corrections	to	previous	problem	areas
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) Refer to Spill and Accident Prevention Plan for Procedures.

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#### Gin Landfill Leakage 40 CFR 264.52

The facility does not have a leak detection system because it has been demonstrated that liquid will not migrate into the liner during the life of the facility under the provisions of 40 CFR 264.90(b)(4).

### G-5 Emergency Equipment and Power Sources 40 CFR 264.52(e)

Fire Extinguishers

- 1 for gas, oils, solvents, located at office trailer.
- 1 for liquids, electrical, combustibles, located at office trailer.
- l for liquids, electrical, combustibles,
   located at bulldozer.

Caterpillar D-7

- Wide-track bulldozer for spill containment, etc.

Telephone

- Located at office trailer.

Fire Hydrant

- Located north of entrance gate.

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- Additional Requirements for Land Disposal Facilities 40 CFR 270.14(c)

  As provided by 264.90(b)(4), this facility is not subject to RCRA

  groundwater monitoring requirements (see Attachment 15, Groundwater

  Waiver Demonstration), and is therefore not subject to 270.14(c).
- B-3b Floodplain Standard 40 CFR 270.14(b)(11)

  The site is not located within the 100 year floodplain as shown by

  Flood Insurance Rate Map Panel Number 260217 0002 B effective February

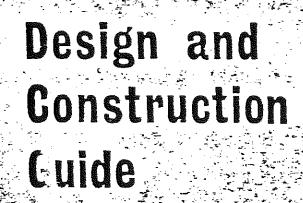
  17, 1982 provided with the Engineering Drawings (Attachment 14).
- B-4 Traffic Information 40 CFR 270.14(b)(10)

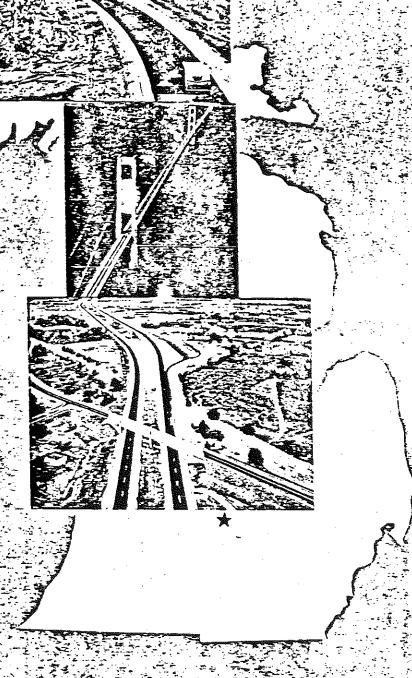
The site access road has supported the transportation of 4 million tons of clay and 8 million tons of waste since 1956. It was built and maintained with steel furnace slag, which provided an excellent subbase for the 25x high stability asphalt mix that was laid down in 1980. This steel furnace slag asphalt mix was laid down in a  $2\frac{1}{2}$  inch base course, overlain by  $1\frac{1}{2}$  inches of finish course. The specifications for the mix design are shown in Attachment 7 along with the MAPA Design and Construction Guide. Note that the facility belongs under a Traffic Class 7 (Medium-Heavy). The access road has been properly designed and constructed to handle traffic of this magnitude.

As of 1984, there has been no sign of cracking or distress in the asphalt. The pavement is 25' x 1000' with a 25' shoulder on each side. All incoming traffic stops at the end of this access road where the manifest check-in trailer is located. Refer to Attachment 8. Speed limit signs are posted at 15 mph.

The load bearing capacity and surfacing of the haul road within Cell II is addressed on pages 70.01A - 70.11A of Attachment 7A.

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ALLEN PARK CLAY MINE - HAUL ROAD BEARING CAPACITY
270.14 (b)(10) - TRAFFIC

#### ANALYSIS OF HAUL ROAD WITHIN CELL II

REFER TO REFERENCE MATERIAL ON ROAD ANALYSIS METHOD WHICH WAS SUBMITTED WITH ORIGINAL PART B APPLICATION. TRAFFIC INDEX = 10 R VALUE OF NATIVE CLAY = 10 R VALUE OF BROKEN CONCRETE SLAG ROAD FILL = 60 FROM FIGURE 8, GRAVEL EQUIVALENT FACTOR,  $G_f = 1.0$  GRAVEL EQUIVALENT,  $G_f = 1.0$  GRAVEL EQUIVALENT,  $G_f = 0.0032(T.I.)(100-R)$   $G_f = 0.0032(10)(100-60) = 1.28$ 

THICKNESS OF BASE MAT'L REQ'D =  $\frac{GE}{G_f} = \frac{1.28}{1.00} = 1.28 FT = 16 / A$ 

A MINIMUM OF 2 FEET OF BROKEN CONCRETE WITH SLAG WEARING SERVICE WILL BE PLACED OVER NATIVE CLAY FOR THE CELL II ACCESS ROAD.

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FLEXIBLE PAVEMENT

STRUCTURAL SECTION

DESIGN GUIDE

FOR

CALIFORNIA CITIES AND COUNTIES

#### ACKNOWLEDGMENT

This revised guide was prepared through the cooperative efforts of the County Engineers Association of California, the League of California Cities and the California Division of Highways. Much appreciation is expressed to the various members and personnel of the above organizations who were responsible for the original design guide which was published in July 1968.

This revised version was prepared by George Sherman, Robert Smith, Joseph Hannon, George Dick and Karl Baumeister of the Materials and Research Department of the California Division of Highways. Credit should also be shared with Paul Wagner and George Ebenhack of the Design Department, Jack Kassel and Herman Woodruff of the City and County Liaison Department of the California Division of Highways, and W. R. Lovering of The Asphalt Institute, for their review and comment. Appreciation is also extended to the City and County Engineers who have reviewed the rough draft and contributed to this publication by their suggestions.

#### FOREWORD

This booklet is intended to provide a concise and useful tool to the designer of city streets and county roads.

The information in this guide has been updated since the last printing in July 1968, but the concepts and methods used herein are not new. However, a new section has been added which covers the design of full depth asphalt concrete pavements.

The guide is based on the results of extensive studies, tests and numerous reports by various agencies concerning the many factors affecting the structural design of roadway sections.

This guide should prove quite helpful to many cities and counties irrespective of the amount or lack of laboratory facilities and testing equipment.

Suggestions for improvements to this guide may be directed to either the County Engineers Association of California or the League of California Cities.

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#### CALIFORNIA DESIGN METHOD

An empirical equation is used by the California Division of Highways for design of flexible pavement structural sections. This equation has its origin in test track data from the Brighton Test Road (1940-43) and the Stockton Airfield Test Track (1942). The test track constants used to develop this equation have since been modified based on results of the WASHO Road Test and, more recently, the AASHO Road Test. These constants have been adjusted to fit test track data to California pavement experience.

### Factors Considered in the Design Equation

- A. Effect of traffic Thickness is a function of this factor (Traffic Index or TI).
- B. Resistance value (R-value) of the supporting layer Thickness is inversely related to the strength of the foundation material as indicated by the stabilometer test (R-value or R).

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- 7. Strength of the pavement structure Thickness is inversely proportional to the strength factor of the materials in the structural section (Gravel Factor or  $G_{\rm f}$ ).
- D. The general thickness design equation may be expressed as follows:

(Resistance to deformation of Thickness = (constant) (Effect of Traffic) supporting layer) (Strength factor of layer being designed)

Specifically  $T = \frac{0.0032(TI)}{G_f}$  (100-R)

For convenience, the relationships expressed in the design equation have been developed in graphical or tabular form, and will be considered in this manner in the further discussions.

### EFFECT OF TRAFFIC (TI)

The effect of traffic on a roadway over its design life is expressed by the Traffic Index. To estimate this factor, it is first necessary to reduce the many different types of vehicles and loads to a common denominator. This common denominator is the 5,000 pound equivalent wheel load (EWL). The destructive effect of one passage of a given truck wheel is expressed as an equivalent number of passages of 5,000 pound wheel loads.

Estimation of the total number of EWL's on a section of road for a given period of time has been simplified by the use of truck constants. A truck constant is a number which represents the total number of 5,000 pound wheel loads which would be generated in one year by the passage of one truck per day in one direction. This truck is assumed to be carrying an average load which has been determined through statistical treatment of axle weight and frequency data. Each axle classification (e.g., 2-axle, 3-axle, etc.) has a separate truck constant. A method for calculating truck constants is shown in Appendix A.

If more accurate truck constants are desired, they should be calculated for the highway or street under consideration (3). Because of the cost, this would normally be done only for special situations where the engineer feels the traffic is unique and he needs the information to effect a savings or justify a heavier section. For the typical situation, the constants listed in Table A-5 of Appendix A may be used. These constants represent the results of statewide loadometer analyses. Most engineers using this manual will be concerned only with the second column of constants entitled "City Streets and County Roads" which were cently developed (3). The first column would be used in the assign of roads and streets with a T.I. of 8 or more.

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TYPE OF FACILITY	T.I.
Minor residential streets and cul-de-sacs.	4
Average residential streets.	4.5
Residential collectors and minor or secondary collectors.	5
Major or primary collectors providing for traffic movement between minor collectors and major arterials.	6
Farm-to-market roads providing for the movement of traffic through agricultural areas to major arterials.	5 - 7
Commercial roads (arterials serving areas which are primarily commercial in nature).	7 - 9
Connector roads (highways and arterials connecting two areas of relatively high population density).	7 - 9
Major city streets and thoroughfares and county highways.	7 - 9

### Streets and brighways can visig beavy back traffic. This would include streets in beavily industrialized areas

For subdivision traffic only, it is permissible to use the chart shown in Figure 2. This chart relates Traffic Index to the number of houses served. It should be emphasized that this chart applies only to residential and residential collector streets. Streets carrying other traffic through the subdivision and streets going by a commercial area should not be analyzed by a house count chart.

Prior to the use of this chart, the engineer should consult with the area planners as to future plans for temporarily dead-ended streets. Many times either commercial developments tie into residential collectors, or the collectors are extended to serve much larger areas.

The chart is based upon each residence generating an average eight trips per day. Truck traffic is assumed to be three percent of the subdivision traffic. The truck traffic is assumed to consist, almost exclusively, of 2-axle and 3-axle vehicles. Truck constants

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of 350 for the 2-axle, and 900 for the 3-axle trucks are based upon the common trucks found on these streets. Truck traffic is assumed to consist of 89% 2-axle, and 11% 3-axle trucks. Traffic Indices are based upon a ten-year design life for the facility.

### Estimation of T.I. in Special Situations

Many times a particular road presents a unique situation which demands that the engineer use a little more judgment to arrive at a truly representative Traffic Index. An example of such a situation might occur where a road serves an agricultural or recreational area or has a heavily used rock quarry at some point along the route. Since the rock trucks would haul one way loaded and one way empty, the engineer could use a different T.I. for each direction of travel and effect significant economy in design.

## QUALITY OF SUBGRADE SUPPORT (R)

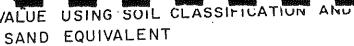
The term "resistance", as used in this guide, refers to the ability of a material to resist lateral deformation when acted upon by a vertical load. When displacement occurs, the soil moves out and away from the applied load. This displacement of soil causes a "wave development" on all sides of the load. The object of the design procedure is to keep this displacement within certain limits, depending on traffic and surfacing.

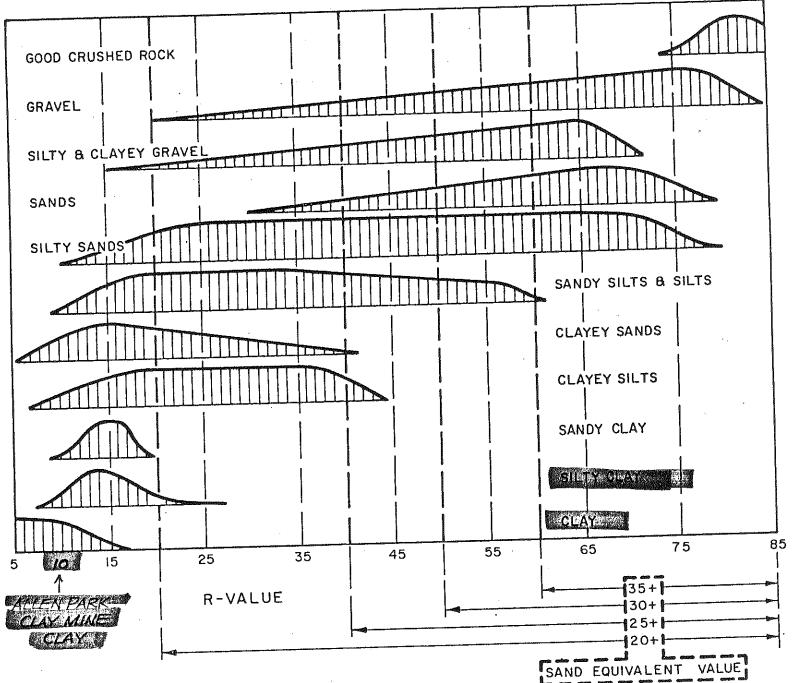
Measurement of the resistance or R-value is made by means of the stabilometer test. An index of resistance to displacement is arranged on a scale from 0 to 100. Theoretically, water would have an R-value of 0 since it would transmit pressure equally in all directions, while steel would show an R-value of 100 since no measurable deformation would occur. Soils and aggregates will range from less than 5 to about 85.

The R-value is determined using soil specimens which are compacted in a manner to approximate the condition of soil in the field. The specimens are tested in a state as near to full moisture saturation as possible. Thus, the R-value represents the worst possible state the soil might attain at the typical field density state.

The procedure also takes into account the fact that some soils are expansive. When a compacted soil expands on exposure to free water, the density and particle arrangement of the mass are disrupted causing a lowering of the stability of the material. This is compensated for in the California design method by determining the expansive tendency of the soil at various water contents. If the expansion is found to be above that tolerable, the data is used to adjust the R-value downward. This results in design of a thicker cover layer because of the lower strength within the supporting soil caused by the water taken on during expansion.

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# STRENGTH OF STRUCTURAL LAYERS (Gf)

The capacity of the structural section layers to resist the forces imposed by traffic is expressed in terms of their "gravel equivalent factor  $(G_f)$ ". This is an empirical factor developed through research and field experience, which relates the relative strength of a unit thickness of the particular material (AC, CTB, Class 3 AS, etc.) in terms of an equivalent thickness of gravel. It is important to note that the various materials must meet certain quality requirements (grading, R-value, SE, etc.) in order to have the strength assumed for the gravel factor assigned.

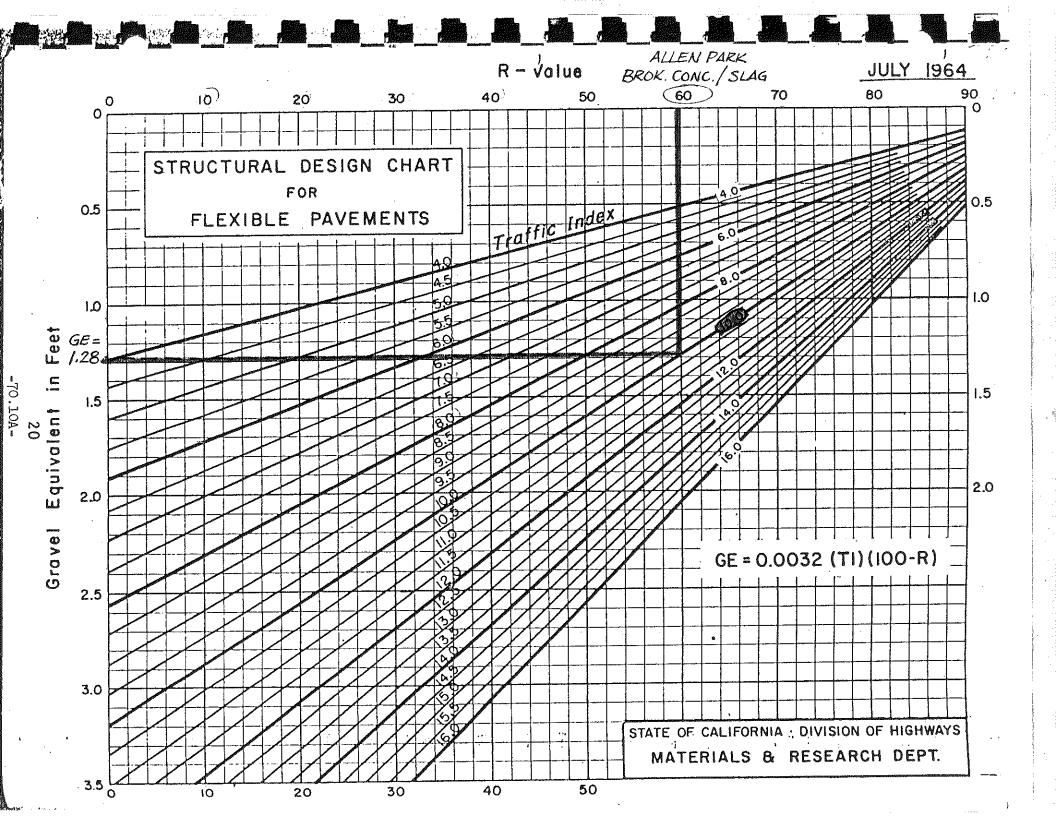
Gf values assigned to the various construction materials are tabulated in Figure 8 and in Test Method No. Calif. 301. A graph illustrating the relationship between Gf for asphalt concrete and the Traffic Index is shown in Figure 6. This graph enables interpolation between the values shown in Figure 8 and allows the designer small advantages in economy if he chooses to design by the formula rather than by tables.

# STRUCTURAL SECTION DESIGN PROCEDURE

Standard design procedure is shown in Test Method No. Calif. 301. This procedure uses the design formula and allows the designer to design each layer to the most economical thickness. Use of this formula requires three variables: T.I., R-value, and Gf.

The design chart shown in Figure 7 is taken from the test method, and offers a quicker approach to the design problem. Complete instructions for use of the chart are shown in Figure 8.

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#### FIGURE 8

# . INSTRUCTIONS FOR USE OF STRUCTURAL DESIGN CHART

- Find total GE Intersect TI line with basement soil R-value line and read GE.
- Find GE of surfacing Intersect TI line with base material R-value line (Use R-80 for Class "B" CTB) Select type of base to be used. and read GE. For Class "A" CTB select the surfacing thickness from Table III.
- Find thickness of surfacing Convert GE to actual thickness using T=GE/Gf or if thickness was found in Table III solve for GE. Round off thickness to the nearest .05 foot or, preferably, to the next highest .05 foot and adjust the GE accordingly.
- Find GE of surfacing + base Intersect TI line with subbase material R-value line and read GE.
- Find thickness of base Subtract the adjusted GE found in Step 4 from the GE in Step 5 and convert the remainder to thickness using T=GE/Gf. Round off the thickness to the nearest .05 foot or, preferably, to the next highest .05 foot and adjust the GE accordingly.
- Find thickness of subbase Add the adjusted GE from Step 4 to the adjusted GE from Step 6, and subtract the result from the GE found in Step 1. Round off to the nearest .05 foot or, preferably, to the next highest .05 foot.

TABLE 1 Gravel Equivalents of Structural Layers in Feet

				G	Laver	Rdaraere										
						-aviceE(	ne -			,		Ce	ment-t Bas	reated e	_ (	
				A	SPHALT	CONC RE	I E							<del></del>		
_					Traff	Ic Inde	X (TI)					BTB	Cla			100
								11.5	12.5	13.5		and		. B	444	
	5		6.5	7.5	8.5	9.5	10.5		13.0	14.0	ETB	LTB	A		100000000000000000000000000000000000000	100
	and	5.5			9.0	10.0	11.0	12.0				Gf	G	£	Control of the Control	est est est est
Actual	below	6.0	<del></del>	22201	Faulva	lent Fa	ctor (G	f)							Section 1	See Vill
thickness				TAAGT	Pd.					1.52	1.3	1.2	1.7	1.2	2.5.00000	
of layer				1	1 00	1.79	1.71	1.64	1.57	1					10000000	
	2.50	2.32	2.14	2.01	1.03				_	- 30	0.26					
feet					- 20	0.36	0.34	0.33	0.31	0.30	0.33					
	0.50	0.46	0.43	0.40	0.38	0.45	0.43	0.41	0.39	0.38		0.36				
0.20	0.63	0.58	0.54	0.50	0.47		0.51	0.49	0.47	0.46	0.39	0.30	•••			
0.25	0.75	0.70	0.64	0.60	0.57	0.54	0.51	• • • •				- 40			0.39	0.35
0.30	0.75	0.70	• • •					0.57	0.55	0.53	0.46	0.42	• • • •		0.44	0.40
		0.81	0.75	0.70	0.66	0.63	0.60	0.66	0.63	0.61	0.52	0.48		0.54	0.50	0.45
0.35	0.88		0.86	0.80	0.76	0.72	0.68		0.71	0.68	0.59	0.54	0.77	0.60	0.55	0.50
0.40	1.00	0.93	0.96	0.90	0.85	0.81	0.77	0.74	0.79	0.76	0.65	0.60	0.85		0.61	0.55
0.45		1.04		1.01	0.95	0.90	0.86	0.82		0.84	0.72	0.66	0.94	0.66	0.01	
0.50		1.16	1.07	1.11	1.04	0.98	0.94	0.90	0,86	0.0.	•				0.66	0.60
0.55			1.18	1.11	1.0.					0.91	0.78	0.72	1.02	0.72	0.66	0.65
0.3311					1.13	1.07	1.03	0.98	0.94	0.91	0.85	0.78	1.11	0.78	0.72	0.70
0.60				1.21	1.23	1.16	1.11	1.07	1.02		0.91	0.84	1.19	0.84	0.77	0.75
0.65				1.31		1.25	1.20	1.15	1.10	1.06	0.98	0.90	1.28	0.90	0.83	
					1.32	1,34	1.28	1.23	1.18	1.14		0.96	1.36	0.96	0.88	0.80
0.70						1.43	1.37	1.31	1.26	1.22	1.04	0.50				- 65
0.75						1.43	1.5.						1.45	1.02	0.94	0.85
0.80							1.45	1.39	1.33	1.29	1.11	1.02	1.53		0.99	0.90
						1.52		1.48	1.41	1.37	1.17	1.08			1.05	0.95
0.85			-				1.54	1.56	1.49	1.44	1.24	1.14			1.10	1.00
0.90									1.57	1.52	1.30	1.20			1.16	1.05
0.95				•				1.64	1.65	1.60	1.37	1.26	1.79	1.26	1.10	
1.00			• • • •	• • • •					1.05	2.50						
1.05																

NOTES: ETB is emulsion treated base constructed with emulsified asphalt.

BTB is bituminous treated base constructed with asphalt.

For the design of road-mixed asphalt surfacing, use 0.8 of the gravel equivalent factors  $(G_{\hat{\mathbf{f}}})$ shown above for asphalt concrete.

-21-

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# E-2 Interim Status Groundwater Monitoring Data 40 CFR 270.14(c)(1) 40 CFR 265.90 40 CFR 265.94

During the facility's initial year of Interim Status (November 1980 - November 1981), a hydrogeological study was performed on the site which included the installation of five monitor wells in satisfaction of Federal and State regulations. Quarterly samples were then taken to provide initial background data, while at the same time additional information was being obtained to demonstrate that there is no potential for migration of liquid from the regulated unit to the uppermost aquifer during the active life of the unit.

Groundwater monitoring data obtained during Interim Status is provided in Attachment 16. The data is grouped as follows:

page 226

Drinking Water Standards Appendix III page 212

Contamination Indicating Parameters page 221

Additional Water Quality Parameters

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### E-3 Aquifer Identification 40 CFR 270.14(c)(2)

There are two sand formations on site. The uppermost formation is a beach sand deposit that varies from 0-8' in thickness but is limited in regional extent due to excavations and construction projects in the vicinity. These sands are water bearing when the perimeter surface drain is in a state of efflux.

Since this formation lies above the disposal cell lined walls, there is no potential for migration of leachate from the regulated unit into this formation. However, to alleviate all concerns, the surficial sands lying adjacent to the disposal cell are to be removed during the 1985 construction season and replaced with compacted clay. Under these conditions, the provisions under 40 CFR 270.14(c)(2) thru 270.14(c)(8) do not apply.

The uppermost aquifer is then identified as being the sand formation lying approximately 80 feet below grade.

E-4 through E-8 not applicable per E-1.

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### D-6i Control of Wind Dispersal 40CFR 270.21 (b) (5)

The Facility Standard states that:

"If the landfill contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the landfill to control wind dispersal."

Particulate emissions caused by wind erosion of landfill wastes or soil cover material can be minimized by various forms of physical, chemical or vegetative stabilization. Wind dispersal of landfilled wastes will be controlled primarily by regular compaction of waste material, and daily application of cover material over all exposed waste surfaces during the active life of the landfill. As individual cells are brought to final grade, the final clay cover and synthetic fabric top liner will be constructed over these areas, thus further sealing the landfill and isolating waste material from potential wind dispersal.

Wind dispersal of daily cover material must also be controlled. This will be done by application of dust settling water spray on a regular basis as necessary. Ford Motor Company presently has a 2500 gal. water tank truck on site on a full time basis. This is presently manned and operated by D & S Liquid Transport under a contract with Ford Motor Co. Ford will maintain this agreement or a similar one on a continuing basis for the life of the landfill. If necessary during extremely dry periods, they will also arrange for chemical stabilization applications through the same firm. Regular water spray applications will also be applied to interior unpaved access roads to control dust and blowing soils. Paved roads will be swept by mechanical sweepers at regular intervals to remove soil material.

Final cover and vegetative growth will be used to permanently stabilize the final landfill surface. Upon completion of the final clay and synthetic fabric cover, topsoil and seed, fertilizer and mulch will be applied to establish a final dense grass cover on the landfill.

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This to certify that the above stated provisions of sections D-6f through D-6i are required to comply with the provisions of 40 CFR 270.21.

CHARLES CREMIN ENGINEER No. 13662

MIDWESTERN CONSULTING, INC.

Charles Cremin

Registered P. E. #13662 Mich.

(JD84030-AA)

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Ford Motor Company



3001 Miller Road Dearborn, Michigan 48121

APR 1 6 1985

April 9, 1985

EPA, REGION V

Attention: 5HS-13 U.S. Environmental Protection Agency Region V 230 South Dearborn Street Chicago, IL 60604

Re: Liner Compatibility Test Report

RCRA Part B Application Ford Allen Park Clay Mine E.P.A. I.D. No.

Attention: 5HS-13:

Enclosed please find four copies of the subject waste/liner compatibility test report. Please insert the report between pages 109A and 110A of the above referenced Part B application.

Should you have any questions, please contact Mr. David Miller at (313) 322-0700.

Yours very truly,

Ben C. Trethewey, Manager Mining Properties Department

DSM:dp

Enclosures

cc: Mr. Al Howard, MDNR

COPY



Ford Motor Company

3001 Miller Road Dearborn, Michigan 48121

FORD ALLEN PARK CLAY MINE LANDFILL WASTE/LINER COMPATIBILITY TEST REPORT RCRA PART B APPLICATION E.P.A. I.D. NO. MID980568711

This laboratory report documents the testing of nine candidate flexible membrane liner (FML) materials for use in a hazardous waste landfill. The materials were tested for their original properties, their properties after exposure to distilled water and their properties after exposure to anticipated leachate. The polyethylene (high density) material was chosen for the Ford Allen Park Clay Mine Hazardous Waste Cell II liner as indicated by the Liner Report prepared by the engineering consulting firm of Neyer Tiseo & Hindo (page 104.1A of the Part B application).

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UNREINFORCED HATERIALS ORIGINAL PROPERTIES (ASTM D 638 Die 'C', 20in(508)	Polye	thylene	. Р	VC 1030	Suck	-Tite	STAFF CPE (	lil Resistant	tab. No. 30 Page 2 Hobel C	5184 PE
ass/Min.)										
	Parallel	Perpen.	Parallel	Perp <del>en</del> .	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
Tensile Strength, psi(mpa)	4450(30.7)	4620(31.8)	3060(21.1)	2690(18.5)	7680(52.9)	7530(51.9)	1900(13.1)	1800(12.4)	2030(12.4)	1750(12.1)
Elongation, \$	854	849	364	372	491	480	346	467	393	472
Rodulus & 100%, psi(mpa)	2040(14.1)		1570(18.8)		1540(10.6)	1500(10.3)	1175(8.1)	650(4.48)	1116(7.65)	
Rodulus @ 2001, psi(mpa)	2089(14.1)		2104(14.5)		2125(14.7)		1420(9.8)	873(6.02)	1340(9.24)	
Modulus & 300%, psi(mpa)	2100(14.5)	- 1		2310(15.9)	3310(22.8)		1705(11.8)		1628(11.2)	
Hardness, pts 'O'	58	58	38	38 .	37	37	35	35	35	35
Tensile Set, \$	575	700	10	10	20	20	155	160	230	210
13.32.72		,,,,		,-				.,,	-5-7	
Tear Strength , lb/in(kM/M) (ASTM D 624 Die 'C')	790(138)	840(147)	350(61)	352(62)	546(95.6)	560(98.0)	231(40.4)	181(31.0)	264(46.2)	231(40.4)
Puncture Resistance (FTMS 101 B, Method 2065, tes	ted 8									
700 mg/Hin.)										
Sample Thickness, in(me)	0.036	(0.91)	0.030	(0.76)	0.926	(0.66)	0.830	(0.66)	0.033(	(8.84)
Pucature force, lbf(K)		(226)		(210)		(425)	34.8	(155)	42.70	(190)
Elongation, in(mm)	9.60	(15.2)	0.83	(21.1)	1.59(	40.4)	0.90	(22.9)	8.97	(24.7)
Bonded Seam Strength  (ASTH B 412 Die 'A' samples  cut across seam)  Trecile Strength mei(max)		3032(20.9)		2424(16.6)		6923(47.7)		1440(9.9)	1210(8.3)	10 012F41
Tensile Strength, psi(mpa)						91.9		86.8	69.1	82.8
Tensile Strength, % of orig.		65.6		90.1		31.3		00.0	07.1	02.4
<sup>1</sup> Dielectric Helded Seam <sup>2</sup> Solvent Helded Seam		,								
JOINENI RETUCU JESS										•
8onded Seam Peal Strength (ASTM D 413, 1X6in(25X300mm)	strips									
180° peel,50mm/Min)	A.F. 1.0	44.83	10.0	(* E)	70.7	/( A)	4 6/1	£3.	1.8(0.3)	2.4(0.4) <sup>2</sup>
Peal Strength, lbf/in(k#/H)	85.4	14.9)	19.8	(3.5)	39.3	(6.9)	8.8(1	,1	1.0(4.3).	2.4(0.4)
Hater Vapor Transmission										
(ASTH E 96 Nethod BM 30 Days)	)									
Rate g/K <sup>2</sup> /24h	9.42	!	3.08		. 14.	98	0.5	14	0.2	8
Heat Resistance after 28 days	s 100°C	•								
(ASTM 0 573 )										
Temsile Strength change, \$	-16	-32	<b>†</b>	-1	-34	-16	+4	-12	-13	-2
Elongation change, \$	-13	-10	-11	-12	+12	+19	+4	-6	+5	+4
' us & 100% change, %	+7	÷3	+34	+25	-19	-17	+16	<b>+3</b>	<b>+5</b>	+7
Lius & 200% change, %	+5	+3	+22	+18	-53	-35	+12	<b>+3</b>	+1	+6
Hodulus @ 300% change, %	+6	+4	+13	+10	-27	-42	+5	+2	-6	-1
Mardness change, pts 'D'	+2	÷2	<b>+7</b>	+5	<del>-</del> 3	<del>-</del> 3	ė	ê	•	ê
	' 6		1 '	-		•	•	-	-	
Tear Strength change, \$	+5	+6	+34	+21	-5	+6	+16	+44	+25 -3	+9

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						n.		Lab. No. 305184 Page 3
		ethy lene		1030	Ouck-T		STAFF CPE Oil Resistant	Hobel CPE
Leachate Reistance after 30	Parall days 8	,	Parallel	Perpen.	Parailel	Perp <del>e</del> n.	Parallel Perpen.	Parallel Perpen.
Tensile Strength change, \$	+3	16	-8	-[	-26	-21	-3 -21	-7 -5
Elongation change, \$	-1	-10	+2	· -1	+2	-ĉ	ê <b>-</b> 8	-7 -7
Modulus ê 100% change, %	÷Î	~3	-13	-6	-31	-27	-4 -18	-4 -10
Modulus & 200% change, %	+ 1	-3	-9	-4	-35	-68	-1 -13	-4 -2
Modulus & 300% change, %	ŧî	-1	-7	+2	-42	-36	-12	-2 +4
Kardness change, pts 'D'	+2	+2	-8	-6	+3	+3	-5 <del>-</del> 5	-3 -3
Tolume change, 1		0	+2		+3		+15	+11
Tear Strength change, \$	+8	+2	+5	-5	-20	-19	-44 +1	0 +4
Puncture Rresistance change	., 1 -	10	+6	j	-33		-11	-12
Leachate Reistance after 60	days &	50°C					,	
(ASTN D 471) Tensile Strength change, %	+6	-3	-9	-5	-25	-28	-7 -15	-7 -6
Elongation change, \$	-10	-5 -15	+1	-3 -3	*23 +4	~20 ~8	-1 -15 -11 +5	-7 <del>-6</del> +3 -5
Bodulus & 160% change, %	+6	-13 -1	-10	-5 -6	-27	-31	-11 +5 -6 -14	-2 -12
Hodulus & 200% change, %	+6	-2	-9	<del>-6</del>	-29	-60	-1 -12	-1 -6
Modulus & 300% change, %	+5	-2	-6	-5	-36	-29	+1 -15	-4 +5
Yolume change, 1	.,	+1	43		. ,o +3		*1	+14
Mardness change, pts 'D'	+2	+2	-8	, -8	+1	+2	-5 -5	-5 -5
Tear Strength change, \$	+5	+2	-5	-å	-19	-23	-9 +4	+18 -6
Puncture Rresistance change	•	-8	-14		-41		-18	-9
Leachate Reistance after 90	days @	50°C				÷	ter?	
(ASTH D 471)	.19	72	l e		76	TA		• 4 • 5
Tensile Strength change, \$	+12	-35 -12	-5 -3	-6	-30	-30	+4 -16	-14 -17
Elongation change, \$ Nodulus & 100% change, \$	-2 +1	-12 -3	-8 -8	0 -8	+5 -28	+4 -31	-5 -3 -2 -15	-1 -3 +7 -10
Modulus & 200% change, %	rı Ö	-3	-6	-0 -5	-20 -34	-51 -62	-2 -15 +4 -16	
Rodulus & 300% change, %	+1	-2	-5	-6	-43	-42	+5 -13	+1 -4 -6 -6
Yolume change, \$		0	+		45 <del>4</del> 5		+12	+15
Hardness change, pts '0'	+2	+2	-8	* -8	-1	, -1	-6 -5	0 -2
Tear Strength change, \$	+3	+1	+11	-6	-16	-24	-10 0	+4 -5
Puncture Rresistance change		-3	ž	17	-25		-14	41
Leachate Reistance after 12 (ASTM D 471)	20 days (	<u> 50°C</u>				÷		
Tensile Strength change, \$	0	-14	-2	+3	-19	-28	+4 -17	-4 +1
Elangation change, \$	-5	-14	+10	+9	+18	+23	÷7 -5	-2 -2
us 0 100% change, %	+5	+2	-13	-7 ·	-24	-Z8	₹/ <del>-</del> 5 0 -15	+20 +4
Nodulus & 200% change, %	+6	+1	-10	-4	-24 -34	-20 -62	+4 -13	+14 +9
Rodulus & 300% change, %	+7	+2	-10	-4 -4	-34 -46	-0∠ -45	+3 -10	+14 +7 +7 +7
		₹4	1 -16	-	-40			
Values chance V	.,	-i	1	_8	1	L.A	110	116
Yolume change, %		-1 . +2	1	-8 -8 :		\$4 **	+19	+16 A A
Hardness change, pts '0'	+2	+2	-6	-6	+3	÷Š	<b>-</b> 5 <b>-</b> 5	0 0
•	*2 +9		-6 +4		+3 -16			



Bistilled Hater Resistance	Parallel	•	PVC Parailel	ie3e Perpen.	Buck-Îi Parallei		STAFF CPE 011 Parallet	lesisteet Perpea.	Lab. He. Page 4 Hobel CPE Parailei	Jesie4 Perpen.
(ASTN 0 471)										
Tensile Strength change, \$	+5	+2	-11	-6	-27	-22	42	-13	<b>-6</b>	+13
Elengation change, %	-6	-7	. 4	-4	₩.	∳ į	-24	-25	<b>\$</b> 3	-20
Bodulus & 1001 change, I	+1	-2	-12	-7	-31	-26	-1	-25 _	-7	-10
Bodules & 2007, change, S	+1	-2	-8	-4	-35	<del>-6</del> 8	+12	-12	-6	+9
Bodules & 300% change, %	+1	-1	-7	-4	-41	-37			+7	+28
Tolume change, I		8	+3	;	42		+57		0	
Mardmess change, pts 'B'	+2	+2	-3	<b>-</b> }	+3	+3	-12	-12	<b>ڙ-</b>	-3
Tear Strength change, \$	+4	+5	-6	-12	-17	-11	-5	+&	+13	
functure Bresistance change	, J 1	1	-]		-34		-14		-15	
Bistilled Mater Resistance	after 60 t	ays 8 50°C	- Control of the cont							
(ASTR 0 471)	,,	4-2				_				
Teasile Strength change, \$	-11	-27	-12	-5 .3	-29	-25	-i3	-37	+3	+4
Elongation change, %	-10	-1	-1	+7	-2	+2	-24	-29	-19	-30
Rodulus & 180% change, %	÷1	-1	-13	-1	-33	-35	<del>-9</del>	-34	+ [ ]	-14
Modulus & 2001 change, I Modulus & 3001 change, I	++	-2	-10	<del>-6</del>	-35	-63	<b>+</b> §	-24	+14	+13
Yolume change, I	71	-1	-19	-9 -41 ·	-38	***	-[4	+20	+34	
Hardness change, pts '8'	+2	·	45	•	+2		+56		+57	
Tear Strength change, \$	+5	+2 +1	-3 -7	-3 13	<del>-</del> 5	-5	-15	-15	-10	-10
functure Bresistance change	-	۴۱ خ	-19	-17	-17 -40	-13	-17 -32	-20	-5 -22	-3
Ristilled Nater Resistance (ASTN 8 471) Teasile Strength change, \$ Elongation change, \$ Nodulus 8 180% change, \$ Nodulus 8 280% change, \$ Nodulus 8 380% change, \$ Yolume change, \$ Nardness change, pts '8' Tear Strength change, \$ Puncture Rresistance change	+7 -18 +3 +3 +4 +4	15 -6 -1 -1 0 0 0 +2 +2	4	-2 +2 -7 -6 -5 -5 -15	-26 +2 -24 -31 -38 -2 -21	-22 +7 -22 -58 -36 -2 -2 -19	-11 -36 -7 +5  +86 -20 -18	-20 -23	+3 -26 +12 +38  +59 -22 +6	+11 -31 -19 +4 +22 -22 -12
Bistilled Mater Resistance (ASTM B 471) Tensile Strength change, 5 Tengation change, 5 Modulus B 1865 change, 5		-32 -2 +2	-7 +& -10	+1 +6 -3	-20 +20 -24	-21 +2 <b>6</b> -23	- <del>9</del> -38 -1	-51 -35 -32	+13 -5	+1 -25
Modulus & 1867 change, 5	+2	+2	-9	-> -4	-24 -31	-60	~! +8	-32 -29	+14 +15	- <b>i</b>
Lodulum # 3001 change, I	+2	4£	-10	-4	-31 -42	-61	P(6)	-29 -27	+15 +15	+11 +24
Volume change, 5		-2	,,,	•		+2	+11		*13 #9	174
Marchess change, pts '8'	+2	+2	-6	• -5	-5	-4	-20	-20	-5 -5	-15
Tear Strength change, g	÷7	<b>*</b> 5	-1	+1	-5	-13	-16	-18	+26	+6
Puncture Rresistance chang		13	1	4	-1		-10 -5		-}	ΔĐ
			_		,		•	•	,	



REMINFORCED MATERIALS	de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la						Lab. No. 30 Page 5	Lab. No. 305184 Page 5	
	ficos PVC Parallel	Регрев.	83518 CPE Parallel	Perpen.	#9210 Hypa Parailei	loa Perpen.	Moble CPE : Parallel	Supported Perpen.	
Briginal Properties									
(ASTN 0 751 1x6ia(25x300mm) strips)			0 0#410 Al		4 49844 45	A A98/4 A1	4 457/1 71	A APP/1 11	
Thickness, in(mm)		0.034(0.8)		0.035(0.9)		0.038(1.0)		0.855(1.4)	
Tensile at Fabric Break, Lbf/in(kM/M)	355(62.1)	315(55.1)	178(34.2)	136(23.3) 40	182(31.9) 30	143(25.8) 44	176(30.8) 40	141(24.7) 35	
Elongation at Fabric Break, \$	38 355(62.1)	42 315(55.1)	32 28(4.9)	26(4.6)	29(5.1)	25(4.4)	65(11.4)	33 80(14.8)	
Witimate Tensile Strength, lbf/in(k#/M) Witimate Elongation, %	30	42	570	665	182	350	226	610	
Rodulus 8 1061, 154/in(kN/H)	JV	74	15(2.6)	11(1.9)	26(4.6)	21(3.7)	56(9.8)	79(13.8)	
Hodulus & 2001, lbf/in(kN/)	******		18(3.2)	14(2.5)	30(5.3)	22(3.9)	64(11.2)	45(7.9)	
Modulus @ 300%, ibf/in(kM/M)		######################################	22(3.9)	18(3.2)	*****	25(4.4)		52(9.3)	
Puncture Resistance (FTMS 1018, Method 2065, tested at 200mm/Min)		· .							
Sample Thickness, in(ma)		4(8.9)	0.036(0.9)		0.838(0.9)		0.859(1.5)		
Pucature Force, 1bf(N)	135(600)		32.2(148) 0.58(14.7)		61.8(275) 6.39(10.0)		81.6(363) 0.65(16.6)		
Elongation, in(em)	8.92	(10.7)	8.28	₹1# <i>.11</i>	0.37	(10.0)	V.03	(10.0)	
Bonded Seam Strength									
(ASTM D 412 1x6in(25x300mm) strips)				** *** **		107/10 71		•	
Tensile at Fabric Break, Lbf/in(kM/N)		252(44.1)		61.8(16.8)		107(18.7)	138(24.2)	129(22.6) <sup>2</sup>	
Tensile at Fabric Break, \$ of orig., \$  1 Dielectric Helded Seams 2 Solvent Helded Seams		80.9		44.8		74.7	97.9	91.5	
Bonded Seam Peal Strength (ASTH D 413, 1X6in(25X300mm) strips 180° peel,50mm/Him)									
Peal Strength, Hbf/in(kH/H)	29.2(5.1)		4.5(4.8)		24.7(4.3)		18.5(3.2) <sup>1</sup> 2.7(0.5) <sup>2</sup>		
<u>Mater Yapor Transmission</u> (ASTM E 96 Method BM 30 Days) Rate g/M <sup>2</sup> /24h	2	.57	0.9	ae.	I.	.12	0.28		
anie žiu leiu	£4		***	•	••		****		
Heat Resistance after 28 days 100°C -									
(ASTN D 573)			7	18	٨	A		<b>A</b>	
Thickness change, \$	9 -11	0 -14	-3 -3	+3 -7	9 +3	₽ +15	€ ÷15	₿ +15	
Tensile at Fabric Break change, \$ Elongation at Fabric Break change, \$	-11 -7	-14 -17	-3 -12	-15	t) (t	+13 -18	-16	-(4	
Frongarion at radric break change, s  #**imate Tensile Strength change, S	-11	-14	-4	• • •	+38	+40	-22	-24	
Aate Elongation change, \$	-7	-17	-73	-31	-60	-85	-7 <del>9</del>	-10	
Hodulus & 180% change, &	***		+67	+54			****	-40	
Modulus & 2001 change, I			+50	+17		040		+26	
Hodulus & 300% change, %		***		+14				+2	
Puncture Resistance change, \$	-6		-52		+32		+9		

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#### CENTRAL LABORATORY

Leachate Resistance after 30 days 8 58°C	\$1008 PYC		#3510 (	r. PE	#9210 Hy	palon	Lab. Mo. Page 6 Moble CPI	385184 Supported
	Parallel	Perpen.	Paral let	Perpea.	Parailel	Perpen.	Parailei	Perp <del>en</del> .
(ASTN 0 471)	*							
Thickness change, \$	+3	0	-3	•	0	ê	8	-7
Tensile at Fabric Break change, \$	6	-6	-15	-35	-12	+12	-3	+1
Elongation at Fabric Break change, \$	÷20	0	-3	•	-13	-4	-16	+20
Bitimate Tensile Strength change, %	0	-6	-25	-43	+31	+7	+14	-1
Bitimate Elongation change, &	+20	9	+27	+75	+75	-14	+42	+35
Hodulus & 180% change, %			-40	+100	-8	+5	-2	-62
Hodulus & 2001 change, 1	****		-44	-56	+3	+23	9	-15
Modulus & 300% change, %	****		-56	-54		+28		-17
functure Resistance change, \$	-13		-12	!	-3	•	-16	
<u>Leachate Resistance after 60 days 0 50°C</u> (ASTN 0 471)								
Thickness change, #	0	Û	-3	8	â	Û	+2	-2
Tensile at Fabric Break change, \$	-3	-2	-24	-59	-13	<del>-</del> 1	+14	-4
Elongation at Fabric Break change, \$	-3	-17	+6	+18	ð	-10	-10	+3
Ultimate Tensile Strength change, \$	-3	-2	-21	-29	+40	+74	+20	-24
Ultimate Elongation change, %	-3	-2	+23	+49	+69	-13	+25	-14
Nodulus 8 180% change, %			-47	-33	-15	-5	+23	-49
Modulus & 2001 change, I	0-00-0		-50	<del>-</del> 61	+3	+18	+14	-11
Modulus & 300% change, %	664		-46	-64		+24	-11	-!1
Puncture Resistance change, &	-17		-2(		-		-16	
Leachate Resistance after 90 days @ 50°C (ASTN D 471) Thickness change, \$ Tensile at Fabric Break change, \$ Elongation at Fabric Break change, \$ Ultimate Tensile Strength change, \$ Ultimate Elongation change, \$ Hodulus @ 100% change, \$ Rodulus @ 200% change, \$ Rodulus @ 300% change, \$ Puncture Resistance change, \$	-4 -10 -4 -10   	e -17 -21 -17 -21 	-3 -23 -16 -14 -23 -20 -28 -27	+3 -24 0 -25 -5 -5 -61 -64	6 -8 +3 +55 +55 +4 +13	+10 -9 +36 -30 +14 +59 +36	9 -8 0 +17 +39 +23 +9 	-2 -21 -3 0 -10 -46 -7 -4
Leachate Resistance after 120 days @ 50°C  (ASTM 0 471)  Thickness change, \$  Tensile at fabric Break change, \$  ** ration at fabric Break change, \$  ** sate Tensile Strength change, \$  **Bodulus & 100\$ change, \$  **Rodulus & 200\$ change, \$  **Rodulus & 300\$ change, \$  **Rodulus & 300\$ change, \$  **Rodulus & 300\$ change, \$	-7 -20 -7 -21 	-14 -2 -14 -2 -14 -2 	-6 -27 -6 -22 +58 -48 -56 -55	+3 -3 0 -24 +32 -47 -56 -59	-6 +13 +55 +75 -4 +13	0 +4 -7 +24 -2 +14 +27 +36	+4 +14 0 +18 +55 +14 +8	-2 8 -3 -5 +16 -54 -11
Puncture Resistance change, \$	-14		-6		•	5	-7	!

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#### CENTRAL LABORATORY

	•						Lab. No. 305184 Page 7			
<u>Bistilled Water Resistance after 30 days @ 50°C</u>	/1008 PVC Parailel	Perp <del>e</del> n.	#3510 CF Parallel	}{ Perpen.	19210 Hy Parallei	-	Moble CPI Parallel	Supported Perpen.		
(ASTN 0 471)										
Thickness change, \$	0	0	0	+3	0	Û	+2	-4		
Teasile at Fabric Break change, %	5	-12	-41	-31	-12	+9	-14	-17		
Elongation at Fabric Break change, \$	-7	-10	-6	+150	+13	49	-20	-14		
Ultimate Tensile Strength change, %	-5	-12	-54	-32	+38	+20	+23	-5		
Bitimate Elongation change, \$	-7	-10	-25	+40	+130	+29	+24	-20		
Rodulus & 190% change, %	<b>=-</b> 00400		0	-20	-27	-14	+32	-54		
Nodulus & 200% change, %			-28	-56	-13	+14	+12	0		
Modulus @ 300% change, %		***	-36	-59		<b>48</b>		+4		
Puncture Resistance change, \$	-13		-29	3	-9	·	~å			
Bistilled Hater Resistance after 60 days & 50°C (ASTM D 471)										
Thickness change, \$	0	0	6	0	0	Ð	+2	-7		
Tensile at Fabric Break change, I	-4	+1	-25	-43	-16	+9	+10	+9		
Elongation at Fabric Break change, %	-7	-14	+19	-12	-7	-4	-10	-3		
Bitimate Tensile Strength change, \$	. <u>.</u>	÷1	-46	-54	+38	+28	+26	-13		
Ultimate Elongation change, \$	-1	-14	-8	-38	+90	+9	+35	-20		
Hodulus & 190% change, %			-40	+40	-15	-14	+7	-62		
Nodulus & 200% change, %		400	-50	-12	-3	+8	+12	-13		
Nodulus & 300% change, %		***	-50	-54		+8	***	-2		
functure Resistance change, \$	-12		-3	0	-7	!1	-26	l		
Bistilled Hater Resistance after 90 days @ 50°C										
(ASTH D 471)	. 0	ê	-3	+3	0	0	+2	-6		
Thickness change, I Tensile at fabric Break change, I	-13	-11	-5 -17	-39	-16	Ô	-13	-2		
Elongation at Fabric Break change, \$	-20	-24	-6	+25	-3	-4	+12	0		
filimate Tensile Strength change, \$	-13	-11	-43	-54	+48	+32	+29	-12		
Ultimate Elongation change, \$	-20	-24	- <del>4</del> 6	-43	+89	ù	+15	-29		
Rodulus & 180% change, %			-13	+67	+23	-5	+9	-61		
Hodulus & 200% change, %	***	***	-39	-50	-3	+14	+14	-16		
Nodulus @ 300% change, %			-41	-46		+24		-15		
Puncture Resistance change, \$	-19		-1	1	•	13	-1	1		
Bistilled Nater Resistance after 120 days & 50°C										
(ASTH B 471)										
Thickness change, \$	8	•	-6	<b>*</b> }	0	+3	+6	-6		
Tensile at Fabric Break change, 1	-8	-16	-24	-44	-21	-1	ŧ3	+7		
Elongation at Fabric Break change, \$	-18	-2	-12	-25	0	-4	0	. 0		
nate Tensile Strength change, \$	-8	-16	-46	-46	+31	+20	+20	-30		
Dirimate Elongation change, \$	-10	-2	-58	-32	+153	+26	+62	-12		
Modulus & 100% change, %		***	+68	-47	-31	-24	4[]	-52		
Rodulus & 200% change, S	400		-28	-50	-23	-9	+7	-16		
Nodulus & 300% change, %			-46	-46		0	***	-16		
Puncture Resistance change, \$	-19		+2	2	-1	9	1	9		

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Ford Motor Company

3001 Miller Road Dearborn, Michigan 48121

July 10, 1984

RCRA Activities
Part B Permit Application
U.S. EPA Region V
P. O. Box A 3587
Chicago, IL 60690 - 3587

Attention: 5HW-13

Subject:

Ford Allen Park Clay Mine Part B Permit Application

MID 980568711



WMD-RAIU EPA, REGION V

Pursuant to your letter of January 16, 1984, Ford Motor Company Allen Park Clay Mine herewith submits its "Part B" application in quadruplicate for a hazardous waste management facility permit under Section 3005 of the Resource Conservation and Recovery Act of 1976.

This application package includes both "Part A" (revised) fulfilling the requirements of 40 CFR 270.13, and "Part B" fulfilling the requirements of 40 CFR 270.14 and 270.21.

A revised "Part A" is submitted to make a complete single application document. The revision reflects the reduction in process design capacity and the incorporation of four additional waste types into the facility's waste management capability. This submittal is also consistent with direction received from Mr. Joe Boyle of EPA Region V at a meeting held in your offices on June 5, 1984 and subsequent telephone conversations.

The "Guidance for Permit Application Preparation" document was utilized in this submittal. We believe that this application is complete in that all of the requirements of 40 CFR 264 and 270 are addressed in detail. The only remaining technical issue is the data which characterizes the proposed additional waste types. This information will be provided to complete Section & when the wastes become available.



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RCRA Activities Page 2

Should you have any questions concerning the Ford Allen Park Clay Mine "Part B" application, please contact me at (313) 594-2242.

Yours very truly,

Ben C. Trethewey, Manager
Mining Properties Department

Attachments

ar arababan

cc: Mr. Alan J. Howard, MDNR

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#### Ford Allen Park Clay Mine

#### MID 980568711

#### Part "B" Application

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### Ford Allen Park Clay Mine

## MID 980568711

## Part "B" Application

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# Ford Allen Park Clay Mine MID 980568711

#### Section A Part A Application

This section contains the Ford Motor Company Allen Park Clay Mine Part "A" Application and Amendments in addition to the present revision of July 10, 1984. The Allen Park Clay Mine facility now operates under the EPA interim status standards in conjunction with applicable state rules and regulations.

The Part "A" Application and Amendments will be retained "on-site" and as an integral section of the Part "B" Application.

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# U.S. ENVIRONMENTAL PROTECTION AGENCY HAZARDOUS WASTE PERMIT APPLICATION Consolidated Parmits Program (This information is required under Section 3005 of RCRA.)

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C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES (cade "TO4"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

#### IV. DESCRIPTION OF HAZARDOUS WASTES

- A. EPA HAZARDOUS WASTE NUMBER Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number(s) from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.
- B. ESTIMATED ANNUAL QUANTITY For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste/s/ that will be handled which possess that characteristic or contaminant.
- C. UNIT OF MEASURE For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE CODE	METRIC UNIT OF MEASURE CO	DDE
POUNDS, P	KILOGRAMS.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ĸ
TONS	METRIC TONS	м

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

#### D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in column A select the code/s/ from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes, If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

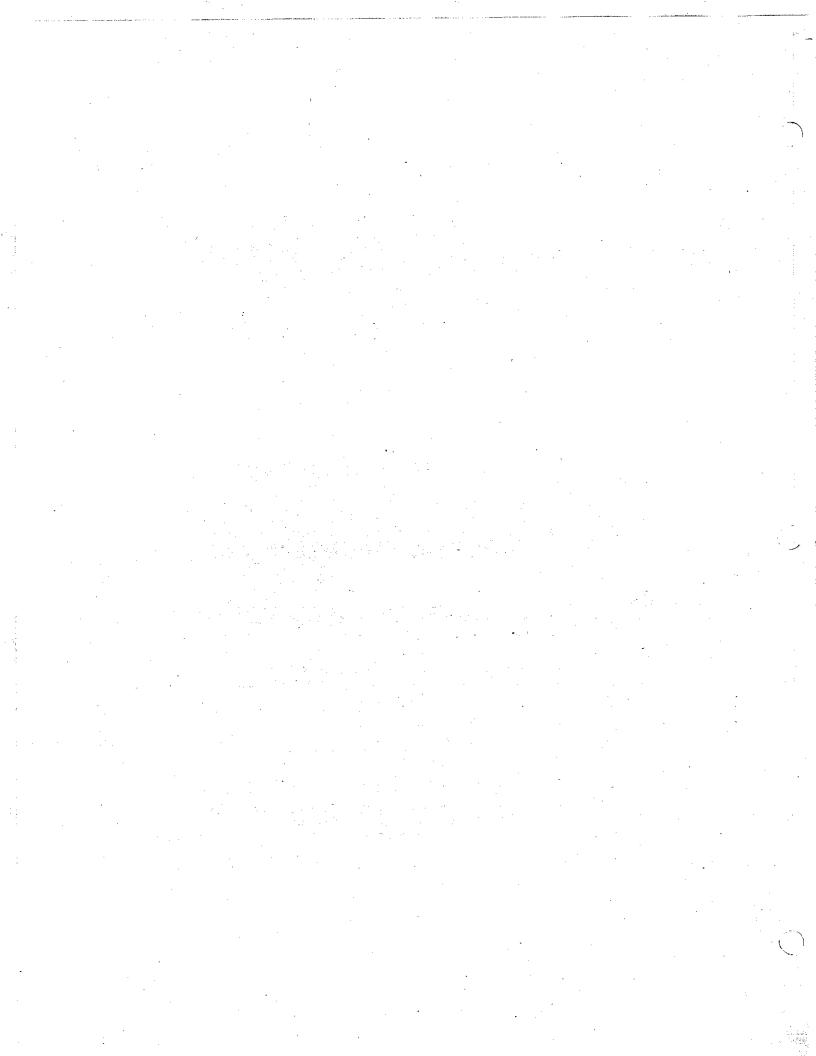
- 1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
- In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
- 3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

**EXAMPLE FOR COMPLETING ITEM IV** (shown in line numbers X-1, X-2, X-3, and X-4 below) — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

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IV. DESCRIPTION OF HAZARDOUS WASTE	S /continued		
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Executive Vice President Ford Diversified Products Operations

June 21, 1983

Paul T. Sullivan.
President
Rouge Steel Company
3001 Miller Road
Dearborn, Michigan 48121

Pursuant to authority redelegated to me by the President of Ford Motor Company (the "Company"). I hereby delegate to Paul T. Sullivan authority to take such action as he may deem necessary or appropriate with respect to assets of the Company included as a part of the assets of the former Steel Division of the Company but not transferred to Rouge Steel Company, up to the levels of authority of a Divisional General Manager of the Company as described in the Capital Assets section of the Executive Authorities Manual issued from time to time by the Company.

This authority supercedes my April 18, 21983 redelegation to Mr. P. T. Brosnahan : 1989 up | 4 pril 18

T. C. Page

cc: Sidney Kelly



Ford Motor Company

3001 Miller Road Dearborn, Michigan 48121

June 30, 1983

U. S. Environmental Protection Agency Region V RCRA Activities P. O. Box A3587 Chicago, IL 60690

Subject: Revised RCRA Part A Permit Application

Ford Allen Park Clay Mine Landfill

E.P.A. I.D. #MID980568711

#### Gentlemen:

Attached is a revised RCRA Part A Permit Application for the above referenced Ford Motor Company facility.

The process design capacity of the facility and the estimated annual quantities of hazardous wastes have been modified as indicated on the attached revised forms, consistent with current operations and projected development of the site. The information is consistent with the facility's Michigan Act 64 Hazardous Waste Disposal Facility Operating license issued by the Michigan DNR on October 22, 1982.

If you have any questions concerning these changes, please contact Mr. David S. Miller of my staff on 313/322-0700.

Yours very truly,

Ben C. Trethewey, Manager Mining Properties Department

Attachment

bcc: Messrs. J. S. Amber

A. Basse

J. A. Esper

G. Kircos

S. H. Vaughn

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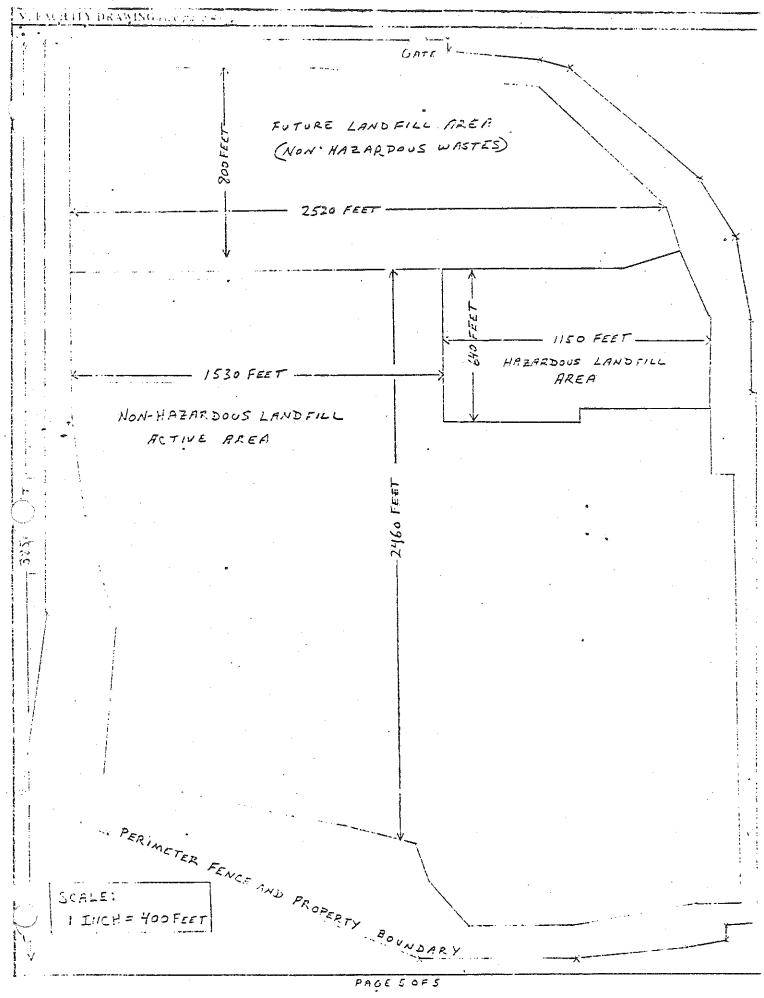
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Executive Vice President Ford Diversified Products Operations

June 21, 1983

Paul T. Sullivan President Rouge Steel Company 3001 Miller Road Dearborn, Michigan 48121

Pursuant to authority redelegated to me by the President of Ford Motor Company (the "Company"), I hereby delegate to Paul T. Sullivan authority to take such action as he may deem necessary or appropriate with respect to assets of the Company included as a part of the assets of the former Steel Division of the Company but not transferred to Rouge Steel Company, up to the levels of authority of a Divisional General Manager of the Company as described in the Capital Assets section of the Executive Authorities Manual issued from time to time by the Company.

This authority supercedes my April 18,51983 redelegation to Mr. P. T. Brosnahan 1 1987 up at April 18,51983 redelegation to my new more of the second superscription of the second superscript

T. C. Page

cc: Sidney Kelly



Steel Division
Ford Motor Company

3001 Miller Road Dearborn, Michigan, 48121

June 5, 1981

Permit Contact (5EP)
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Subject: Revised RCRA Part A Permit Application: Ford Allen Park Clay Mine Landfill EPA I.D. Number MIT 270010093

Attached is a revised RCRA Part A Permit Application for the above-referenced Ford Motor Company facility.

The specific source hazardous waste KO87, decanter tank tar sludge from coking operations, should be added to our permit application. This is in accordance with 46 FR 4619, as published in the January 16, 1981 Federal Register.

The waste previously identified as FO16, dewater air pollution control scrubber sludges from coke ovens and blast furnaces, was removed from the list by EPA on November 12, 1980 (45 FR 74888) and should be deleted from our permit application dated November 17, 1980. The original permit application also indicated that two unspecified wastes identified with EPA I. D. Numbers DOO3, DOO5 and DOO5 would be handled by this facility. Because this is no longer the case, these identified wastes should be deleted from the application. The attached revision shows Page 3 of the Permit Application as it should now appear.

If you have any questions concerning these changes, please advise.

Very truly yours,

Ben C. Trethewey, Manager Mining Properties Department

attachment

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TV DESCRIPT	TON OF HAZARDOUS WAST				
A. EPA HAZAR handie hazaro	DOUS WASTE NUMBER - Enter	the four-digr	t number from 40 part D, enter the fou	CFR, Suppert D ir-digit number/	for each listed hazaroous waste you will handle. If you from 40 CFR, Subpart C that describes the characteris-
	ANNUAL QUANTITY - For each the characteristic or toxic contaminal that characteristic or contaminant.		entered in column olumn A estimate ti	A estimate the que total annual qu	uantity of that waste that will be handled on an annual entity of all the non-listed waste/s/ that will be handled
			_ ·		
codes are:	ASURE - For each quantity enter	ed in column	B enter the unit of	measure code. (	Inits of measure which must be used and the appropriate
	ENGLISH UNIT OF MEASURE		CODE		
$\mathcal{L}$	POUNDS			KILOGRAMS	OF MEASURE CODE
	TONS		•	METRIC TON	\$
If facility reci account the a	ords use any other unit of measure oppopriate density or specific gravity	for quantity, of the waste.	the units of measu	re must be conve	ted into one of the required units of measure taking into
D. PROCESSES	•			-	•
For non-incontained that characters	hazardous wasta: For each listed in now the waste will be stored, treat isted hazardous wastes: For each in Item III to indicate all the protection of the p	characteristic of cesses that will	or toxic contaminated by used to store,	ry. nt entered in coll treat, and/or dis;	in A, select the code/s/ from the list of process codes cost all the non-listed hazardous wastes that possess
	2	iter in the spac	s hinamen ou bade	4, the line numbi	
					cess in the space provided on the form.
Select one quantity o     In column "included	of the EPA Hazardous Waste Number of the Waste and describing all the property of the next line enter the other with above" and make no other enter with above."	pers and enter in occases to be un EPA Hazardo	it in column A. On sed to treat, store, a us Waste Number to	the same line con and/or dispose of that can be used	to describe the weste. In column D(2) on that line enter
3. Repeat ste	p 2 for each other EPA Hazardous \	Vaste Number	that can be used to	describe the haza	rdous weste.
are corrosive only	COMPLETING ITEM IV Ishown in the shavings from leather training at and there will be an estimated 20 ear of that waste. Treatment will be	M nounds nor	user of most work	The estimate will	acility will treat and dispose of an estimated 900 pounds treat and dispose of three non-listed wastes. Two wastes is corrosive and ignitable and there will be an estimated
A. EPA		C. UNIT			D. PROCESSES
HAZARE ZO WASTEN JZ Jenter code	O QUANTITY OF WASTE	SURE (enter code)	1. PROCESS (enter		2. PROCESS DESCRIPTION (if a code is not entered in D(1))
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X-3 D 0 0	1 100	PT	0 3 D 8 0	1 1 1 1	
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EPA Form 3510-3	(6-8C)		PAGE 2 OF	CHRONICAL PROPERTY AND ADDRESS OF THE PARTY	

	war in war of the control of the co			
	Continued from page 2. NCTE: Photocopy this page before completing	if you have	e more than	26 wastes to list.
	EPA 1.D. NUMBER (enter from page 1)	$\top$	VV	FOR OFFICIAL USE ONL
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Form Approved OMB No. 158-S80004

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IV. DESCRIPTION OF HAZARDOUS WASTES	(continued)	
E USE THIS SPACE TO LIST ADDITIONAL P	ROCESS CODES FROM ITEM D(I) ON PA	GE 3.
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V. FACILITY DRAWING		
All esting facilities must include in the space provided of VI. PEOTOGRAPHS	on page 5 a scale drawing of the facility (see instru	ctions for more getail.
All existing facilities must include photographs (attreament and disposal areas; and sites of future styles).	erial or ground-level) that clearly delineate	all existing structures; existing storage,
Y ACILITY GEOGRAPHIC LOCATION		uctions for more detail).
LATITUDE (degrees, minutes, & secon		
		TUDE (degrecs, minutes, & seconds)
VIII FACILITY OWNER		72 74 73 75 77
A If the facility owner is also the facility operator a skip to Section IX below.	is listed in Section VIII on Form 1, "General Infor	mation", place an "X" in the box to the left and
•		•
B. If the facility owner is not the facility operator a		ollowing items:
1. NAME OF FAC	ILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
3 [6		
3. STREET OR P.O. BOY		95 56 - 99 39 - 61 62 - 61
	4. CITY OR TOWN	5. ST. 6. ZIP CODE
	<u>G</u>	
IX. OWNER CERTIFICATION		
I cartify under penalty of law that I have personall documents, and that based on my inquiry of those	y examined and am familiar with the inform	ation submitted in this and all attached
Submitted information is true accurate and comp	leto I am assert the selection of the se	aining the information, I believe that the
subsected information is true, accurate, and compli- including the possibility of fine and imprisonment.	ever and aware that there are significant per	nalties for submitting false information,
A. KAME (print or type)	B. SIGNATURE	
. T. Brosnahan General Manager	D1 Brondo	C. DATE SIGNED
	U. J. 10	June 5, 1981
X. OPERATOR CERTIFICATION		
for fy under penalty of law that I have personally sents, and that based on my inquiry of those	y examined and am familiar with the inform	ation submitted in this and all attached
ted information is true, accurate and complete	ate I am aware that there are in its	aining the information, I believe that the
ing the possibility of fine and imprisonment.	with endire that there are significant per	naities for submitting false information,
A. MAME (print or type)	B. SIGNATURE	
	1	C MATE ALCOHOL
		C. DATE SIGNED

V. FACILITY DRAWING (see page 4)

EPA Form 3510-3 (6-80)

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## U.S. ENVIRONMENTAL PROTECTION AGENCY HAZARDOUS WASTE PERMIT APPLICATION

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PPLICATION DATE RECEIVED COMMENTS																					
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evise	lace an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a swised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's PA I.D. Number in Item I above.																				
A. F	A. FIRST APPLICATION (place an "X" below and provide the appropriate date)  \[ \begin{align*} \text{X} 1. EXISTING FACILITY (See instructions for definition of "existing" facility.																				
8	71 Complete Item Delou.)  18. MO. DAY FOR EXISTING FACILITIES, PROVIDE THE D.										ATE (yr., mo., & day)  ATE (yr., mo., & day)  ICTION COMMENCED  TON BEGAN OR IS										
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			-	SES – CODES AN																	
e: d: B. P	<ul> <li>A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided on the form (Item III-C).</li> <li>3. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.</li> <li>1. AMOUNT — Enter the amount.</li> <li>2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of</li> </ul>																				
	п	78 <b>2</b> 4	ure	used. Only the unit	s of mea PRO-	sure that are I APPROPRI	isted belo ATE UNI	w should TS OF	ld be u:	æd.				PRO	D- API	PROPRI	ATE	UNI	TS OF		
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				ICATION POSAL	D81	HECTARE-N	METER HECTAR	£S		surface impoundments or inciner- ators. Describe the processes in the space provided; Item III-C.)											
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othe	rca	an h	old	400 gallons. The fa-	cility als	o has an incin m/씨로 I	erator tha	it can be	urn up	to 20	galle	ons p	er hour.	1111		\ \	Τ-		Υ	77	
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L E	PA HA	ZAF	100	JS WASTE NUMB	ER — Enter ti	he f	our-	digit numbe ubpart D. er	r from hter th	: 40 ( e fou	CFR, Sı r—digit	ubpart D ti number <i>(s)</i>	or each listed hazardous from 40 CFR, Subpart (	waste you will handle. If you that describes the character	ou ris-
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a. £	STIMA	TEC	) AN	NUAL QUANTITY	' - For each	liste	d wa	ste entered	in colu	, חתונ	A estima	ate the qua	antity of that waste tha	t will be handled on an annu	ual
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•		stec	haz	ardous waste: For								ect the cod	le(s) from the list of pro	cess codes contained in Item	Ш
	to inc	licat	e ho	w the waste will be : d hazardous wastes	stored, treated : For each ci	d, an harac	d/or cteris	disposed of tic or toxic	at the contar	facili minar	ty. It enter	ed in colu	mn A, select the code(s)	from the list of process coo	des
	conta	inec	ni t	Item III to indicate	e all the proce	esses	that	will be use	d to st	ore,	treat, ar	nd/or dispo	ose of all the non-listed	hazardous wastes that poss	ess
	Note:	F	Our	istic or toxic contan spaces are provided	i for entering	pro	cess	codes. If me	ore are	need	jed: (1)	Enter the	first three as described	above; (2) Enter "000" in t	the
	extre	me i	rignt	box of Item IV-D(1	); and (3) Ent	er in	the:	space provid	led on	page	4, the li	ine number	and the additional code	(s).	
2	. PROC	CES	S DE	SCRIPTION: If a c	ode is not list	ed fo	огар	rocess that	will be	used	, descrit	be the proc	ess in the space provided	on the form.	
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	2. In co	lum	nА	of the next line em	ter the other l	EPA	Haza	ardous Wast	e Num	ber t	hat can	be used to	o describe the waste, in	column D(2) on that line en	ter
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Form Approved OMB No. 156 580004 NOTE: Photocopy this page before completing if you have more than 26 wastes to list. FOR OFFICIAL USE ONLY EPÀ I.D. NUMBER (enter from page 1) DUP WM 0 1 0 0 W D U P 0 DESCRIPTION OF HAZARDOUS WASTES (continued) C.UNIT OF MEA-SURE (enter code) D. PROCESSES A. EPA HAZARD. WASTENO B. ESTIMATED ANNUAL QUANTITY OF WASTE 2. PROCESS DESCRIPTION (If a code is not entered in D(1)) 1. PROCESS CODES (enter) (enter code) 29 27 36 27 - 29 27 D80 F016 Т 30,000 2 D 8 0 0 6 14,600 T 3 ס 8 מ DO 5,400 0 5 4 DOOB Included with above 400 5 D 0 03 D 8 0 Ţ 6 7 8 9 10 11 13 14 15 16 17 18 19 20 21 22 23 4 26 CONTINUE ON REVERSE

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VII FACILITY GEOGRAPHIC LOCATION	LONGIT	TUDE (degrees, minutes, & seconds)
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Σ Δ If the facility owner is also the facility operator	as listed in Section VIII on Form 1, "General Infor	mation", place an X III the box
skip to Section IX below.	-	
B. If the facility owner is not the facility operator		2. PHONE NO. (area code & no.
1. NAME OF FA	CILITY'S LEGAL OWNER	
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IX OWNER CERTIFICATION		mation submitted in this and all attached
IX. OWNER CERTIFICATION  I certify under penalty of law that I have personal documents, and that based on my inquiry of the	ally examined and am tamiliar with the imbili-	staining the information, I believe that the
documents, and that based on my inquiry of the submitted information is true, and imprisonments.	plete. I am aware that there are significant p	enalties for submitting false information,
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I certify under penalty of law that I have person	The province I and any familiar with the infor	mation submitted in this and air attached
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